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A Periodical Devoted to the Manufacture and Use of Composition Products

AUGUST, 1927

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See Page 421

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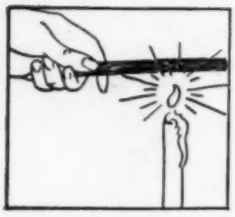

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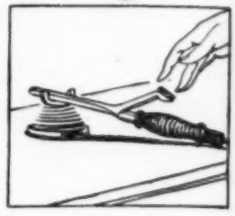

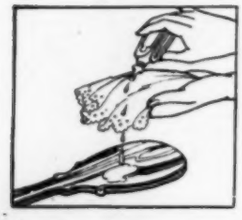

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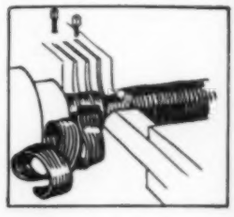

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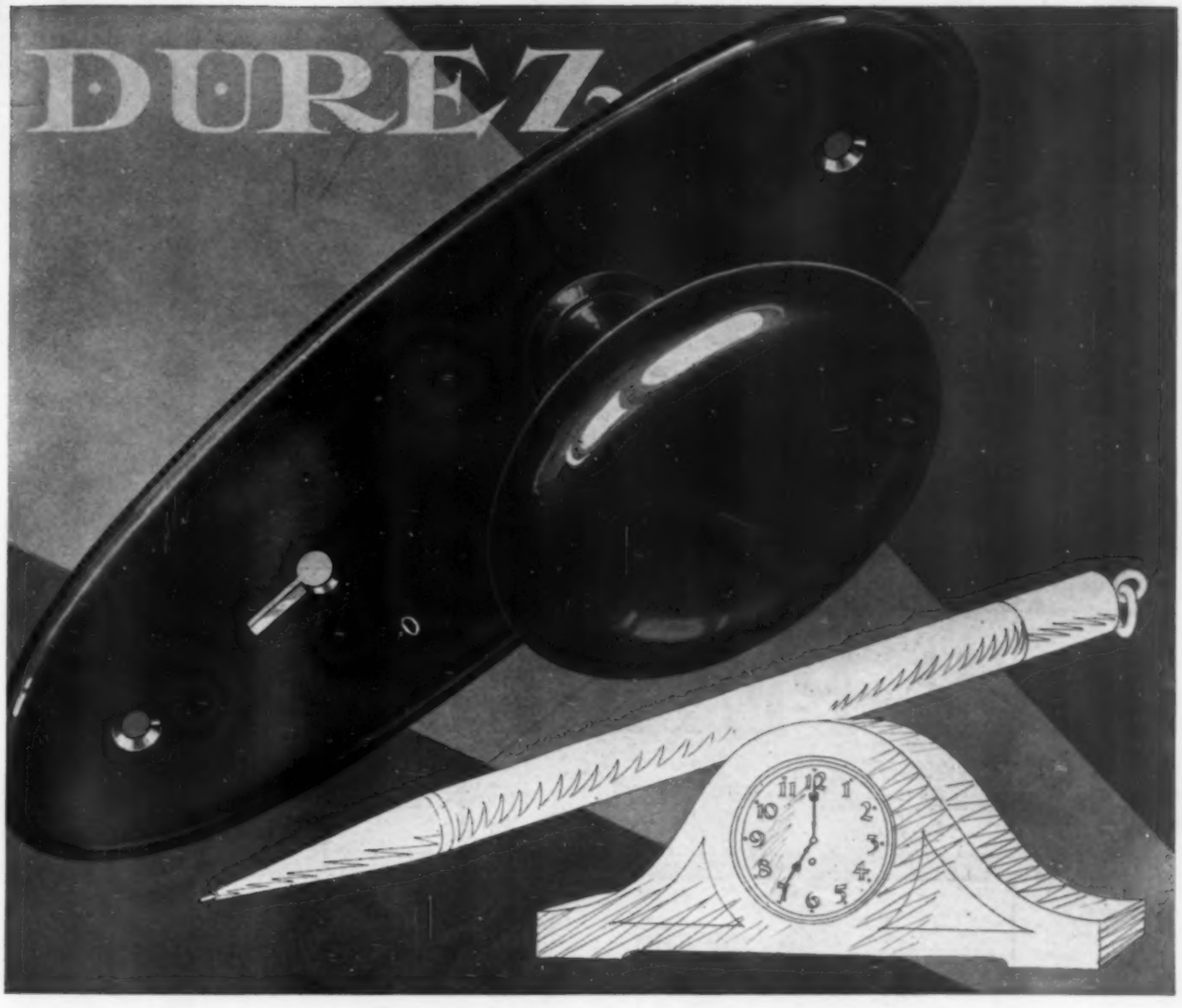

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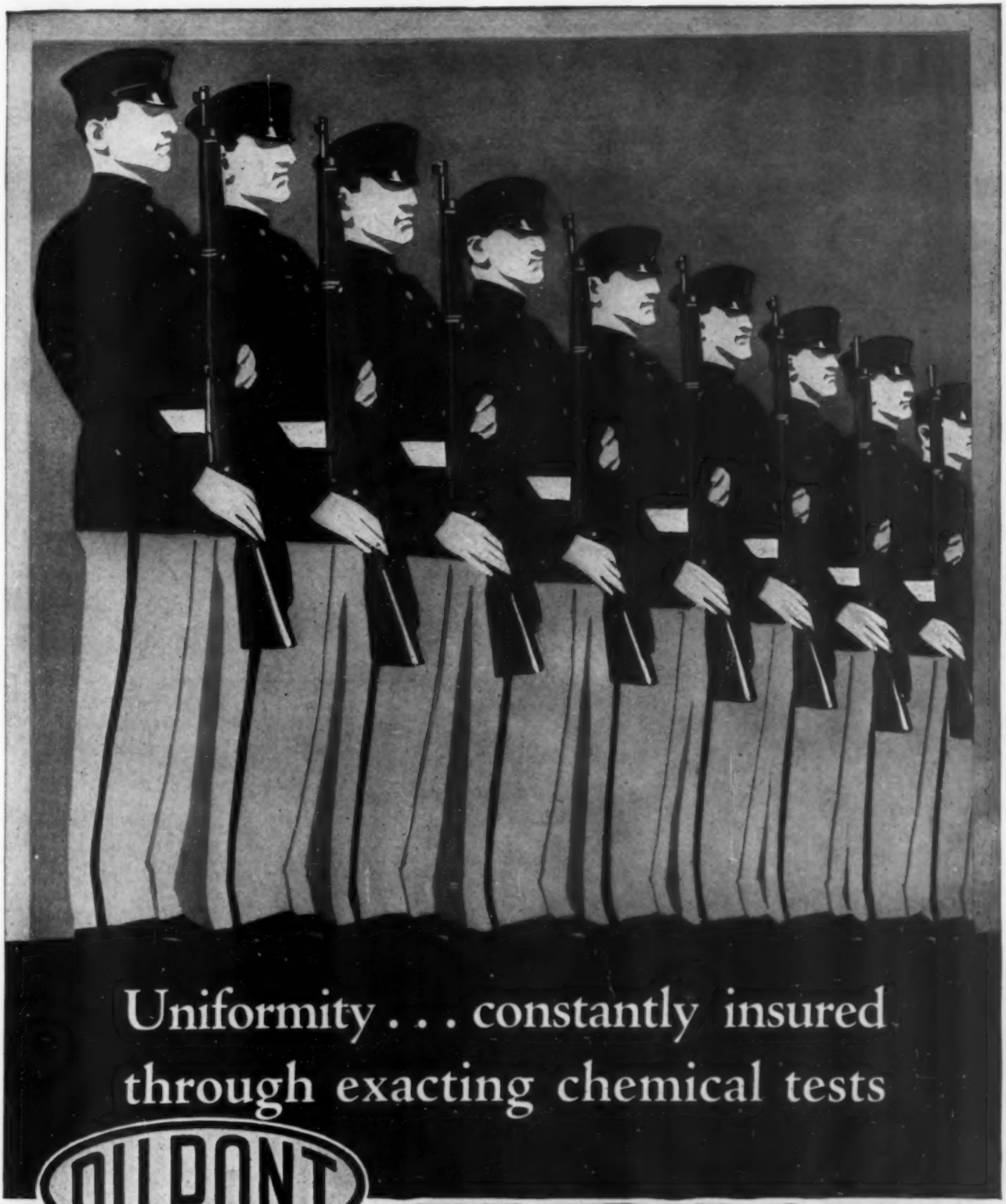

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PLASTICS
& MOLDED PRODUCTS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 3 AUGUST, 1927 No. 8

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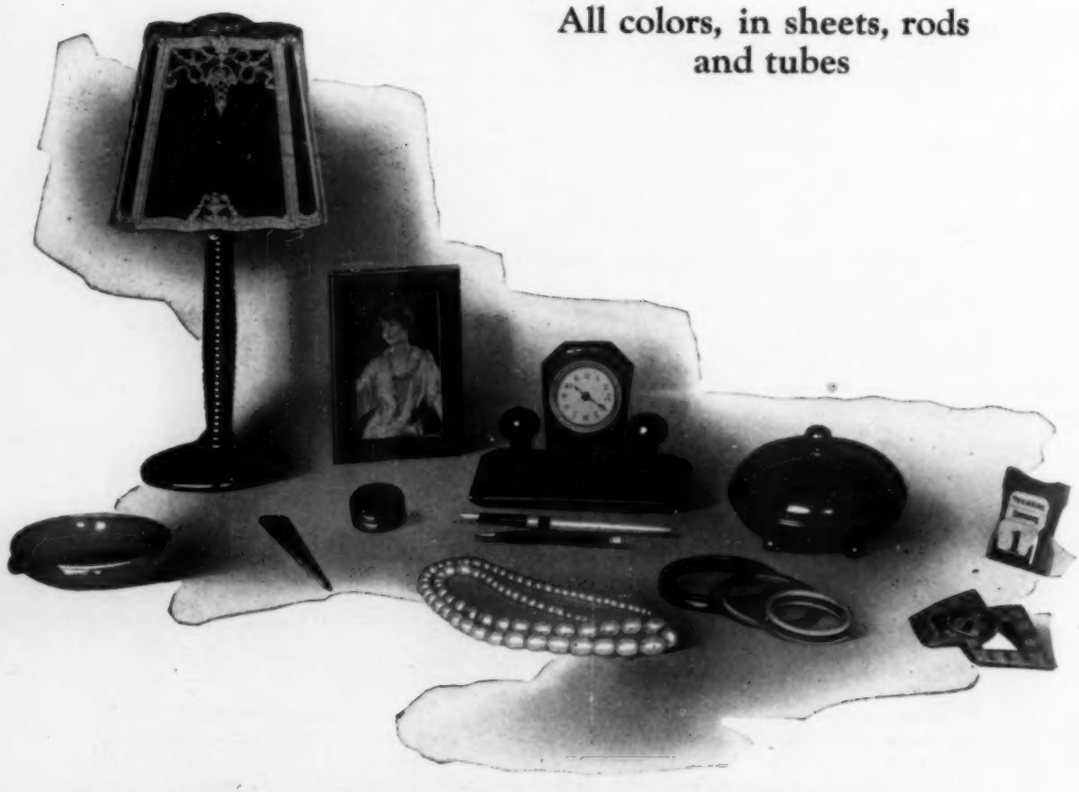

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PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 3 AUGUST, 1927 No. 8

Some Novel Ideas in Combs

Although one of the oldest toilet requisites known, inventors still find patentable features in new modifications

Compiled from recent patents by Carl Marx

IT would seem that the antiquity of the hair-comb were such that new forms of this stable article of commerce were almost impossible to devise, but a perusal of the weekly editions of the Official Gazette of the U. S. Patent Office discloses the fact that variations upon the general theme of "combs" are by no means exhausted. Some of the recent modifications of combs, especially such as can be fabricated from the newer plastic materials as casein solids and pyroxylin plastics, are quite interesting, and may be suggestive of still further improvements in this venerable article of adornment and utility.

Easy Cleaning One Feature

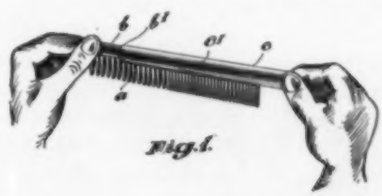
For example, James W. Meek, of Staines, England, has patented a comb (U. S. P. 1,621,425; Mar. 15, 1927) which has for its object to provide means for use with hair combs which will reduce or obviate the accumulation of dust and scurf at the base of the teeth and will facilitate the removal of dust or scurf collected by the comb from the hair, thereby enabling a clean comb to be available for use and to lessen the risk of infection which is at present always possible with combs owing to the said accumulation of dirt or scurf.

Combs date back to the dawn of civilization, and for 100 years inventors here applied themselves to this useful commodity, but apparently the theme has by no means been exhausted as yet.

Many of the new forms of combs will prove amenable to molding as well as cutting—and provide still further outlets for the plastic materials.

Broadly his invention is characterized by the provision of means for use in association with a comb for collecting or receiving foreign matter such as scurf or dirt so as to prevent the foreign matter from accumulating between the teeth adjacent the base of the comb.

The invention may broadly be said to consist in the provision of a member adapted to be detachably applied to the back of a comb and having an edge which when the member is attached to the comb is in advance of the line where the teeth merge or are united to the back of the comb.



The comb invented by J. A. Meek, U. S. P. 1,621,425.

In carrying this invention into practice the detachable member is preferably a channel section member adapted to accommodate the back of the comb. The member may be of metal or any other suitable material and is preferably applied by sliding it endwise on to the back of the comb and for this purpose it is preferred that the back of the comb shall be formed with a channel along one side to receive a correspondingly shaped portion on one side of the channel section member. If desired the back of the comb may be formed on both sides with one or more channels cooperating with correspondingly shaped portions on the channel section member.

How It's Done

Fig. 1 is a view showing how the channel section member can be slid on or off the back of a comb.

Referring to the drawings the comb (a) which can be of any suitable configuration is adapted to receive on its back (b) a channel section member (c) which may be of metal or any other suitable material. This channel section member is pre-

ferably applied to the back of the comb by sliding it on endwise as shown in Fig. 1, and for this purpose the back (b) is preferably formed with a longitudinal groove or channel (b′) adapted to receive a correspondingly shaped channel, pressed in part or projection (c′) formed along one side of the member (c). The member (c) preferably has a nice fit upon the back (b) so that it does not accidentally slide off, and if desired for this purpose the side portions of the member (c) may have a tendency to move resiliently towards each other so as to grip the back (b).

Cleaning

The leading edges of the member (c) extend beyond the part of the comb where the teeth (e) merge into or are united with the back (b).

By this means, foreign matter which the comb collects from the hair during its use would be deposited on to the member (c) and would not accumulate between the teeth as at present occurs with combs.

The leading edges of the channeled members (c) are preferably rounded beaded or curved so that they do not injure the hair.

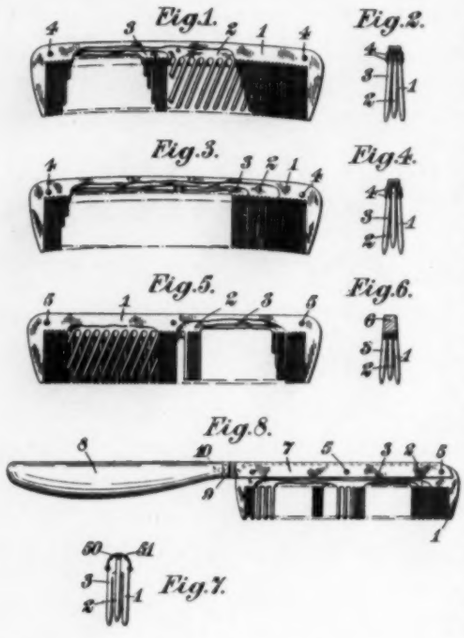
If desired the member (c) may be formed with a channel or its equivalent (c′) on both sides, the back of the comb of course being correspondingly formed with a channel or groove (b′).

To clean the comb it is only necessary to pull off the member (c) as shown in Fig. 1 and to remove therefrom any foreign matter. The member (c) may be a permanent fixture to the comb but is it preferred to make it detachable.

A Hair Waver

Jack Stansfeld Pickford, of Weymouth, England, patented on March 15, 1927, U. S. P. 1,621,269, a hair comb, comprising a plurality of substantially parallel rows of teeth or comb-units arranged side by side for use in imparting a wave to the hair.

An important feature of his invention is to provide an improved construction of comb so that the hairs as they are being combed shall be rubbed by more than one tooth while the comb is passing through them.



A special form of comb to make the hair more wavy. Even a heater may be used in the comb, if proper incombustible materials are used in it. U. S. P. 1,621,269.

This comb comprises in combination at least three substantially parallel rows of teeth arranged side by side and held close together solely along the back of the comb with the teeth of one row spaced apart beyond the roots from the teeth of an adjacent row to provide between each two contiguous rows a longitudinal channel extending from the tips of the teeth to a situation at the roots. If desired, the rows of teeth may be integral with one another along the back of the comb. The comb is of rigid and neat appearance, and the spaces between the rows of teeth enable the hair to be properly deflected without binding or breaking on the teeth, the latter being preferably so arranged that no single hair can pass through the comb without being rubbed or curved in the process. The hairs are cleaned and polished and a wave is imparted to them.

A further feature of the invention consists in providing a means carried by the comb, such as an electric heater in the back of the comb, for the purpose of heating the comb so that the wave imparted to the hair may be set, and according to a still further feature of the invention, one or more of the teeth or rows of teeth may be hollow for communication with a reservoir, which may be in the back of the comb, so that the hair lotions or tonics may be conveyed to the scalp.

The combs may be of any desired suitable material and may be built up of separate toothed units, or they may be moulded or cast or otherwise formed in one piece.

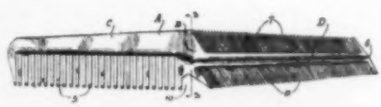
Several embodiments of combs made in accordance with this invention are shown in the accompanying drawing in which:

Figure 1 is a side view of a comb, with parts broken away;

Figure 2 an end view of this comb;

Figure 3 a view similar to Figure 1 showing another comb.

The other figures show still further modifications which can be understood without further description. Fig. 8, for instance, shows a handle that folds back upon the comb, with the hinge at 9 .



John H. Burke's Comb. U. S. P. 1,628,577.

Still another modification of a comb is that proposed by John H. Burke, of Del Rio, Texas, in his U. S. P. 1,628,577, of May 10, 1927.

(*Continued on page 410*)

Styrol Has Many Interesting Possibilities

When polymerized and colored, either alone or in combination, imitations of pearl, amber and precious stones can be made. Research work of Ostromislensky is an excellent example of the fields conquered by modern organic chemistry.

THE number of organic chemical substances which lend themselves to condensation and polymerization is very great, and it is safe to say that despite the already large number of materials which have been patented or proposed, that the "surface has scarcely been scratched" in the search for improved types of molding compositions and synthetic resins.

A tremendous impetus was given to the manufacture of synthetic rubber or caoutchouc during the last World War, and as a result of the research carried out, mostly in Europe, many workable processes were developed. On account of the relative high cost of the materials, many of these processes have remained unused, as in times of peace the natural rubber resins and similar substances were able to compete successfully with the synthetic materials.

For the Future

It should be remembered, however, that almost every day some new process for making a relatively rare chemical *cheaply* is being discovered, and what may be merely a scientific curiosity or even an apparent impossibility, will be commonplace tomorrow. It is for this reason that many of the recently patented processes are highly interesting, especially for what they promise for the future.

Among the foremost of the Russian workers in the field of synthetic rubber, and the polymerization of various organic substances is Ivan Ostromislensky, who has also contributed many very valuable inventions in the field of rubber vulcanization and vulcanizing accelerators. It is for this reason that his patents 1613,673 and 1,613,-674 of Jan. 11, 1927, have a particular interest at the present time. The processes covered by the patents (which are assigned to the Naugatuck Chemical Co.) comprise the manufacture of plastic compositions having a nacreous lustre, and also very perfect imitations of natural amber, from polymerized styrol. This organic intermediate is employed in conjunction with natural rubber, such as pale crepe, balata, gutta-percha or the like, which are dissolved in the styrol. The process is essentially one of polymerization.

The "wizard of test-tube and alembic," as one of our modern writers calls the research chemist, is responsible for all of our present day plastic materials. With few exceptions all molded products are synthetic. Witness the long list of pioneers in this field — almost all were chemists!

Imitation Pearl

For making a plastic product having a nacreous lustre, Ostromislensky proceeds as follows:

Example I.—A gum (rubber such as pale crepe, or balata, gutta percha, etc) unvulcanized or vulcanized, is dissolved directly in substantially pure styrol. The solution is then polymerized to tough meta styrol As the heating is continued, the solution, which first resembles any rubber solution in its transparency, gradually becomes cloudy and by the time polymerization is complete, the solution has been converted into a white or whitish solid product, depending upon the quantity and nature of the gum introduced. Very satisfactory products have been obtained with amounts of pale crepe varying from 1 to 5%, and it is possible to employ as much as 10% or greater. As the quantity of the gum is increased, the properties of the product will vary from those of a modified styrol to those of gum modified by the presence of styrol. In this example, the limit is the amount which can be dissolved in a given quantity of styrol.

Example II.—A mixture of styrol and a rubber solution in a different solvent, such as xylene, is polymerized at approximately 135°-140° C. for 100 to 48 hours. The solvent may then be removed by steam distillation, or the styrol-rubber precipitated from solution, or the solution may be used directly as a varnish. In the latter instance, coloring material may be added if desired.

Where adhesion is required between a pure styrol glass surface and another surface to which styrol will not adhere readily, as for example a rubber surface, a polymerized styrol-rubber xylene solution may be used as a primary coating to be followed by a coating of styrol itself.

Mechanical Strength

Among the advantages gained by the application of the methods herein outlined are a decreased sensitivity to shock greater maleability and flexibilities, and nacreous color effects. Alpha meta styrol or tough transparent polymerized styrol is not easily shattered by a hammer blow. But when 5% of a gum such as rubber has been dissolved therein, the re-

sistance to shock is increased markedly. In many cases the product cannot be split by a chisel, but the chisel penetrates the mass in much the same manner as it would penetrate a malleable metal such as lead. Thin sheets of gum-containing polymerized styrol are appreciably more flexible than alpha meta styrol sheets. When machined in a lathe, the new material cuts with a longer shaving than alpha meta styrol. The addition of a gum to polymerized styrol, in quantities of 1% to 5%, results in the formation of a translucent to opaque product, which possesses a peculiar nacreous lustre which may be used to advantage in preparing colored articles which are to show color effects similar to those of *coral* and *mother-of-pearl*.

Imitation Amber

The second patent (1,613,674) describes a process for making an imitation amber, by using a suitable dye to give it the correct color.

There are many imitations of the natural amber such as phenol-aldehyde condensation products and other resins prepared in somewhat similar manner. Glass has been colored to imitate the natural amber coloring. This glass imitation possesses the disadvantage of a higher specific gravity compared to that of amber. The condensation products require considerable care in their manufacture for the reason that certain of the materials used therein have somewhat poisonous properties or are disagreeable to work with. The polymerized styrols have a gravity approximately the same as that of genuine amber and can otherwise be made practically identical with amber in color and lustre.

The invention broadly stated consists in dissolving an azo dye in unpolymerized styrol and subjecting the solution to complete polymerization, pulverizing the polymer obtained and dissolving a portion of it in raw styrol and polymerizing the solution of the coloring material into a vitreous product.

For example, from 0.5-1.0 grams of an azo dye such as para-amino-phenyl-azobenzene are dissolved in 100 grams of styrol of fairly high purity. The solution is then polymerized completely at the temperatures usually required, say from 140° C.-180° C. During this polymerization the azo dye which is used will be decomposed to what appears to be a new brownish dyestuff. The resultant polymerized solution has a dark brown or almost black color and may be regarded as a coloring material. The dark colored glass thus produced is then pulverized and a small portion thereof is dissolved in unpolymerized styrol. The exact shade desired in the final product will be the same as that obtained in the styrol solution of the dark powder. The styrol solution of this powder is then polymerized under conditions to form the vitreous polymerized styrol. The final product is a transparent low-gravity vitreous mass which has the same color as amber and of the amber imitations.

Using Dyes to Color Transparent Resins

The styrol resins, which are glass-like products, and which can be made practically entirely transparent, open a new field in such types of plastics. It has been found possible to color, or rather dye, these polymerized

(*Continued on page 414*)

Simplified Methods for Shaping Zyl Lens Rims

IN the June issue of PLASTICS (p. 265) ome of the recent patents or short cuts in eye-glass production were reviewed.

Now Nelson M. Baker and Frank Fraser, who are assignors to the American Optical Co., (U. S. P., 1,608,714) describe

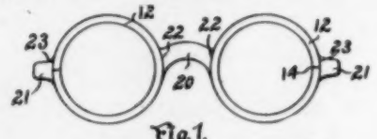


Fig. 1.

Fig. 2.

a method of making unit parts which are capable of being assembled into a variety of types of frames.

Furthermore, reinforcements are provided, and other details make for greater ease in assembly and better appearance and strength. Quoting, in part, from the patent in question, and with reference to the illustrations (Fig. 1 and 2), Fig. 1 is a front elevation of the finished frame, and Fig. 2 is a front elevation of the various parts.

A piece of pyroxylin plastic tubing, for example, is heated until plastic, and then rolled into such shape that its cross section will be a crescent; after which it is further shaped into a circle, so that it will form the rim of the lens-holder, while at the same time, because of the preliminary rolling it will already have the groove for the lens. The ends of the circle thus formed are cemented.

Alternatively, a metallic member of smaller crescent shaped cross section can first be placed into the tube and the same then compressed as already described, thus forming a ring-shaped member with a metallic reinforcement imbedded in it. The other parts are shaped much in the usual manner. The bridge and other parts are cemented to the rims.

It is stated that although the parts are cemented, that the finished frame will be every bit as strong as one stamped from sheet stock. Evidently the method lends itself to mass production, and moreover, there is virtually no waste.

"Laminated Casein Solids"
In an early issue

The Manufacture of Casein Solids

VII. Fabricating the smaller casein articles is often possible by employing the hydraulic press

By Heinrich Prehn
Consulting Engineer, German Correspondent of Plastics

In the sixth article of the present series on the manufacture of casein solids, which appeared on pages 329, 349, of the July issue of PLASTICS, the shaping of casein solids blocks and the cutting of sheets from the same were described in minute detail. In the present (seventh) article the forming and molding of smaller casein articles are taken up.

FOR the manufacture of molded articles from casein plastics, as for example knife-handles, salad forks and spoons, combs, buttons, etc., smaller single-platen hydraulic presses, of the type illustrated in figure 15 can be used; although for large production multi-platen presses and multiple cavity molds may be used.

As the rule these smaller presses are made with a cast steel frame, as these give somewhat better satisfaction. Usually these presses are made to take frames up to 350x350 millimeters, or 350x170 millimeters, depending upon the particular service that they are to render. In order to make possible more economical operation, they are usually made with two platens. The total pressure of such a press may be as high as 60,000 kilograms. The lower part of the press, namely the massive cast steel frame is used as the ram-cylinder. The pressure is taken direct upon the frames, to prevent warping. The general equipment is that of the ordinary regular hydraulic press. Heating is taken care of by means of heated steel plates, which, in some instances, are as large as 1200x600 millimeters.

Molding Buttons

Buttons or similar small articles which are to be made on a production scale, are usually fabricated in special hydraulic presses having an available mold space of 400x400 millimeters, and working at a total pressure of from 100,000 to 180,000 kilograms. Besides the usual equipment the heads of these presses are also provided with two ejecting plungers and a main plunger, the former located at the side of the head.

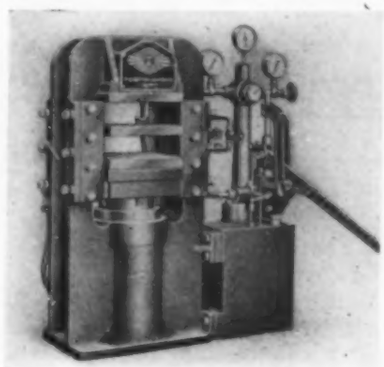


Fig. 15—A typical press for shaping small casein articles such as buttons.

These presses operate as follows: A feeding table or shelf, which is usually at one side of the press and guided by the vertical rods of the press, is filled with the powder that is to be molded, and is then swung over the plate containing the mold cavities. On removal of a slide in the table, the molding powder falls into the molding cavities. The feeding table is then withdrawn and the press closed by hydraulic pressure while at the same time the molds are heated. After the articles have thus been molded, the molds are chilled, and, when the material in the molds is cold enough, the press is opened and the finished articles are ejected. This operation is repeated for each batch of articles, and the process is practically identical with that followed in th molding of other thermoplastic articles. Similar machines are also employed when molding other albuminoid plastics, such as blood-plastics.

Some Patented Methods of Molding Casein

AMANDUS BARTELS and Otto Miech of Harburg Elbe, Germany, have patented a process for molding casein solids. Their patent, No. 1,623,-085, granted April 5, 1927, describes the method thus:

"The usual method of manufacturing shaped articles from artificial horn made of casein consists in obtaining roughly formed pieces from already hardened bars or plates by cutting, stamping or in some other manner, which are thereupon heated up to about 100° in an oil bath or some other suitable way and given their finished form by pressing. The disadvantages of this method are the very laborious and costly operations involved, the difficulty of utilizing the waste often produced in large quantities and the danger of the finished articles becoming deformed when in use, for instance owing to the action of moisture. It has already been proposed to produce shaped articles in a similar manner to the way bars and plates have hitherto been produced, viz, by first pressing the casein material and thereupon to harden and dry the articles so formed. But this method has not been adopted in

(*Continued on page 412*)

The X-Ray in the Service of Industry

Commercial control in manufacture of pressed amber sheets worked out successfully abroad

By Dr. Curt Plonait

From Kunststoffe, 1927, 17, 125

The following is a considerably abbreviated account of a practical method worked out in Germany for detecting otherwise invisible flaws in pressed amber plates. It is customary to unite smaller pieces of natural amber into blocks and sheets or what is practically "artificial natural" amber. In doing this the plates often have invisible internal cracks, hollow spaces and strains, which reduce their value, and the method described in this article makes their detection possible without destroying the plates or injuring them in any way.

AS long ago as 1908 the German Government Amber Works carried out some experiments with the German General Electric Co. for the detection of flaws in pressed amber plates using X-rays. While the process gave satisfactory results, the necessity of making an X-ray photograph of every pressed amber plate rendered the process impossible on a commercial scale by reason of the great cost and the time element involved. Furthermore X-ray apparatus in 1908 was still fairly cumbersome and very expensive. Recent improvements in X-ray apparatus caused a revival of interest, and late in 1926 the experiments which led to the successful solution of the problem were made.

Finding Defects

Since about October 1, 1926, at the Amber works at Konigsberg in Prussia, a regular control method involving the use of X-rays for testing pressed amber plates has been in daily operation. No attempt is made to photograph the plates, the usual fluorescent screen being depended upon to show up the defects in the plates. The plates were then simply marked with pencil at the defective places, so that these spots could be avoided when working the plates up into various articles such as cigarette tips and the like.

In order to permit the inspectors, who in the present case are girls, to work in the ordinary inspection room, and still allow the use of the dangerous X-rays, presented quite a problem, but this was successfully solved, the apparatus being the work of the German firm Siemens-Reiniger-Veifa Gesellschaft.

The transformers and X-ray tube itself are located in a separate small room separated from the testing room by a brick wall lined with lead plates on both sides. A lead-glass window allows of reading the ammeters that control the X-ray tube, and the tube itself is located behind another opening in the brick wall. An aluminum screen in the opening screens out the soft rays. The fluorescent screen is directly in front of the ray opening, and is protected on the side against the operators by lead glass impervious to X-rays. Besides this, as the amber plates cause reflected socalled "soft" rays, the opening is also flanked with lead plates, and the slot through which the plates are introduced have rubber curtains, the rubber containing lead to stop any X-rays.

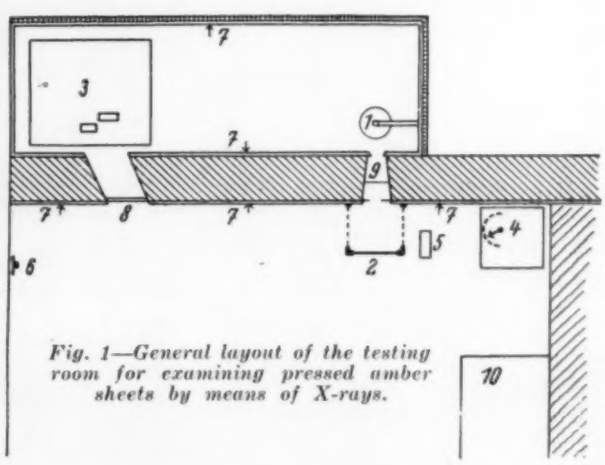


Fig. 1—General layout of the testing room for examining pressed amber sheets by means of X-rays.

Arrangement of X-Ray Tubes

The general arrangement of the outfit is to be seen from the illustration Fig. 1. In this figure 1 is the X-ray tube, 2 the fluorescent screen; 3 the transformers and ammeters; 4 is the control rheostat; 5 the foot-pedal for turning on the high tension current; 6 the main switch for the current; 7 the lead plates protecting the wall on both sides; 8 a lead-glass observing window for the ammeters; 9 the aluminum screen which filters out the soft rays and 10 is the working table.

Protecting Operators

Every precaution is taken to protect the operators, and it was found in actual practice that no harm resulted to them. The amber plates are introduced in the path of the X-rays, between the opening in the

(*Continued on page 414*)

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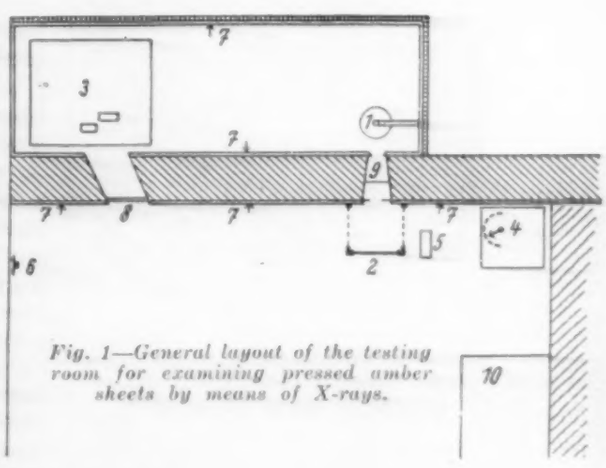

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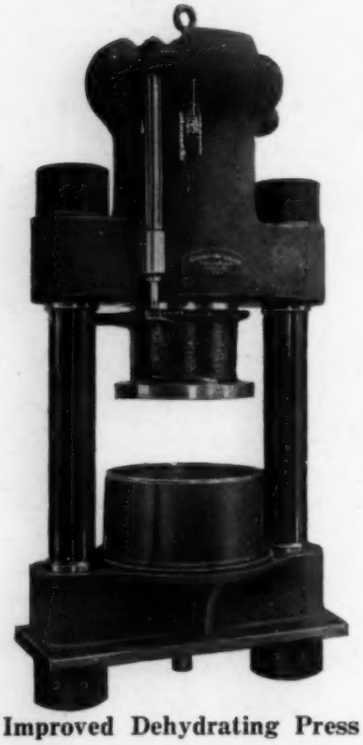

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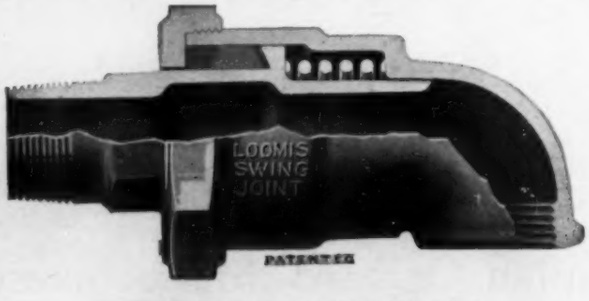

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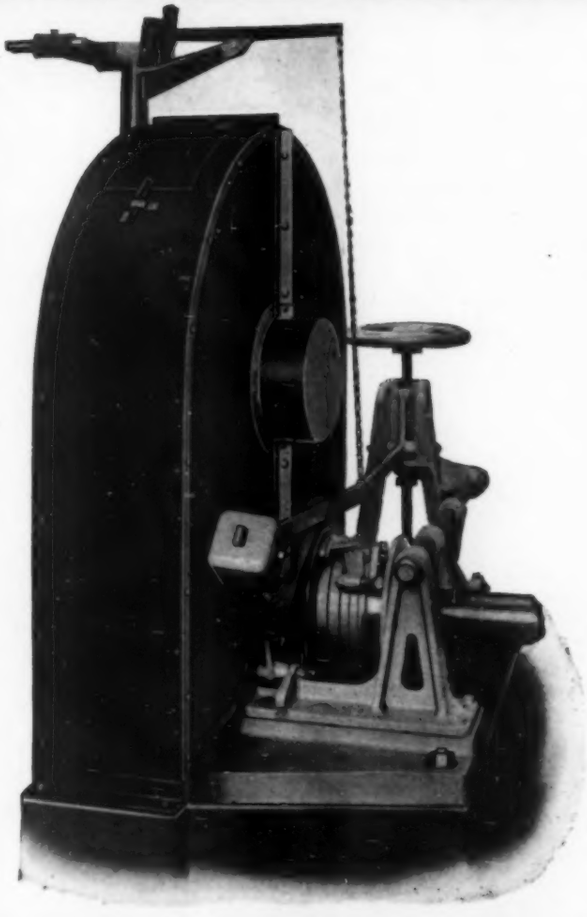

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Some More Light on Pollopas

Patent applied for six years ago reveals some of the details of manufacturing of transparant synthetic "organic glass"

ON May 31, 1921, Dr. Kurt Ripper applied in Austria for a patent on a process for manufacturing homogeneous glass-like condensation products of urea and formaldehyde, applying in America Sept. 9, 1922. Last April 19, 1927, his U. S. Patent, 1,625,283, issued covering the process. As Dr. Ripper has made his application so clear that we can add nothing to enhance its value or interest, we will let him tell us of the invention in his own words. To quote from the patent:

Hardening the Product

"The invention relates to the manufacture of condensation product obtained by the reaction of formaldehyde on a urea.

The condensation products initially yielded by the reaction between these substances are soluble in water, but when treated by heat are gelatinized after a period of time into intermediate products considerably less soluble in water, and finally into products wholly insoluble therein.

Now I have found that the gelatinization of the initial condensation products soluble in water may be accelerated by the addition of water soluble non alkaline compounds having a high degree of electrolytic dissociation. Such salts accelerating the gelatinization may be divided into two groups, the one of which has the property of converting the initial condensation products soluble in water into a fully hard and insoluble state within a few hours, while the majority of accelerating salts do not produce the said result, but only gelatinize the material much quicker than gelatinization would take place without an addition of salts.

To the salts causing the material to harden to the full extent when working in the cold, belong especially ammonium salts, both of strong and of weak acids. A very quick acting reaction accelerator is for instance ammonium sulphocyanate, but other ammonium salts such as ammonium sulphate, ammonium chloride and the like may be used for the same purpose. The physical and chemical properties as well as the appearance of the hard insoluble products vary according to the nature of salts resorted to. When produced in the form of thin films (to allow the water present therein to evaporate easily) these products are as clear as glass and entirely transparent.

To the second class mentioned above belong especially the salts of strong acids, for instance of inorganic acids, such as sulphates, chlorates, chlorides, nitrates and the like. With the exception of ammonium salts their action and its variations is exclusively due to the anion.

By allowing the mixture of the initial condensation product and of the added salt to stand at ordinary room temperature the final state of hardness and insolubility is reached within a shorter or longer period of time according to the nature of the accelerating agent. Water, separating during this hardening, has to be removed. If a thick moulded article is hardened in the cold by means of a quick-acting acceleration agent, clouding and cracks may easily occur. This is due to the fact that the water still present in the material clouds the latter owing to the quick hardening, the said water producing cracks when escaping from the article lying in contact with the air. It is therefore advisable to build up the moulded object in a plurality of layers, allowing one layer or coating to be dried in the air before the next is put on, for the purpose of eliminating the water contained therein.

An Example

As an example of desirable proportions of the ingredients the following may be mentioned:

60 parts by weight of urea, 150 parts by weight of 40% solution of formaldhyde (40% by volume) and 6 parts by weight of hexamethylenetetramine are heated under the reflux of a water bath until test samples do not become cloudy when cooling down. Gelatinization sets in after a short time, if one part of potassium sulphate (or potassium nitrate or potassium chloride or potassium chlorate or potassium iodide or potassium sulphocyanate, etc.) is added to 100 parts of condensation product thus obtained. The gelatinous mass being allowed to stand in the cold, water begins to separate therefrom. The material may now be hardened by letting it stand in the cold, care being taken, that the water is eliminated.

Anything that issues from the laboratories of Dr. Kurt Ripper, the originator of Pollopas Organic Glass (urea-formaldehyde condensation products, see PLASTICS for October 1925, Vol. 1, p. 85) is always interesting to all who are watching the development of this comparatively new form of plastics.

As will be remembered, the urea-formaldehyde condensation products are not only transparent, but also transmit ultraviolet light.

Vulcanized Fiber and Resins Combined

By first impregnating fibrous materials with synthetic resins, followed by treatment with zinc chloride to vulcanize the cellulose of the fabric, a long standing problem is solved

Vulcanized fiber is a very useful material, especially for electrical insulation, and many millions of pounds of it are used every year. It is made, broadly speaking, by treating a material containing cellulose, preferably paper, with some gelatinizing medium such as cold sulfuric acid, zinc chloride solution or cuprammonium solution.

This art is quite old, and the materials have been brought to a state of perfection. Proposals have also been made in the past to impregnate such "vulcanized" fiber with a phenol resin, but it has been found that this is almost impossible of proper accomplishment, inasmuch as the vulcanized fiber is non-porous and, having more of the characteristics of a gel, cannot absorb the phenol resin.

A phenol-furfural resin called "Durite" is preferred by the inventors of a new process that produces a vulcanized fiber that resists moisture, and combines the valuable properties of vulcanized fiber and the laminated resinoid sheets.

Impregnating Comes First

Emil E. Novotny, who has already given the world a large number of valuable inventions in the field of the phenol resin art, and Charles J. Romieux, have discovered that vulcanized fiber and phenol resins can be combined, provided that the vulcanizing is done last.

In the patent covering the process (U. S. P. 1,616,062; Feb. 1, 1927), the inventors say that they find, however, that where a sheet of paper is impregnated with a varnish or resinous body and is not pressed or compacted to a greater extent than necessary to remove surplus material, the paper or sheetlike structure will be capable of absorbing large quantities of water, and this to a much greater extent than if the fiber or cellular structure were gelatinized or altered as by hydrolysis in the vulcanized fiber process. This facility of the resin impregnated or incorporated sheet of taking up various quantities of water makes it possible to introduce the modifying medium such as zinc chloride which causes the hydrolysis of the sheet, and which therefore, after the zinc chloride is removed, results in an intimate mixture of gelatinized or altered or hydrolyzed cellulose and binder, reinforcing medium, or water-proofing agent.

Thick Sheets Possible

This method also permits of the treatment of thicker sheets of paper than would be possible if the waterproofing material or binder were to be introduced subsequently by impregnation into the previously hydrolyzed cellulose. Likewise, thick sheets of laminated fiber can be produced rapidly with only a short washing operation inasmuch as such sheets can be treated practically on a continuous process machine, and after being dried they may be cemented together by the coating of the binder on the surface or the cementing action of the incorporated binder coming to the surface upon being formed as by the combined action of heat and pressure.

To make the method clear it may be stated that the fiber such as paper, cloth or other cellulose material is impregnated with a phenol-furfural resin known as Durite dissolved in a suitable solvent such as, for example, alcohol, this solution being of proper strength to give the percentage of impregnation desired. The sheet may be dried but preferably this operation is dispensed with. The web is submerged in a water bath which removes therefrom the excess alcohol and causes the fibrous body to be thoroughly wetted with water. The web is now run into another vat containing the zinc chloride solution which penetrates into the fibrous structure very readily because of the affinity it has for the water present in the fiber, and the fiber is thereby quickly hydrolyzed. The web is subsequently washed to remove the zinc chloride or other altering media, is dried at low temperature, and may be rolled to be subsequently cut into sheets or used in any desired manner.

An Alternative Method

Another method of incorporating the binder or resinous body with the fibrous cellulose material is as follows:

To the paper pulp in the beaters is added a suitable percentage of resinous material which may be caused to be dissolved in the alkaline water present in the beaters, or the resinous material may be added to the pulp after having been previously dissolved in a suitable solvent. After a beating of

(*Continued on page 407*)

Vegetable Matter a Source of Plastics

Perennial weeds and plants can be utilized for producing pressed articles

AS the use of molded instead of machined products continues to grow, new raw materials are investigated, and, while some of the uses to which the present plastics might be put are impractical at present because of the expense, cheaper materials are most sought for.

Wood flour, saw dust, and similar materials have been molded into various objects for a good many years, but the products are capable of considerable improvement. At the present time much progress is being made, and recent patents cover the utilization of raw materials which are cheap and readily obtainable.

A good example of this type of product is a hard-rubber substitute made from green or dried vegetable matter according to a patent of Thomas B. Mohler, of San Mateo, California, (U. S. P. 1,595,414; Aug. 10, 1926.).

Weeds Used

This invention relates to the treatment of vegetable matter containing the natural gums in order to produce from such vegetable matter, a valuable product which has a semblance to and characteristics of hard rubber, or a substitute wood or plastic-like substance, the product being subject to uses of hard rubber, substitute wood and plastic-like substances.

The invention contemplates the production of a valuable product of the character described from all vegetable matter containing the natural gums, but particularly, however, such vegetable matter which may be readily, easily and cheaply obtained in abundance, for example, weeds of the perennial variety, also other plants which grow or can be grown in abundance everywhere.

Vegetable matter, either green or dried, may be employed in carrying out the invention. For example, vegetable matter containing natural gums is treated in a retort under pressure with water and an agent for releasing the natural gums, such as an alkaline or metallic carbonate or bicarbonate, to reduce the vegetable matter to a homogeneous or plastic mass, which, being pressed into blocks, slabs or sheets simulates hard rubber, substitute wood or plastic-like material. The addition of water is necessary to provide a moisture sufficient to carry the gums in solution and to prevent charring of the mass. Steam may be used in place of water, as by the use of steam sufficient moisture for the purpose may be obtained. The proportion of carbonates or bicarbonates is such as to cause a release of the gums and the proportion may vary dependent on the material used.

Releasing the Natural Gums

Green vegetable matter is placed in a retort, for example, a weed growth of the mallow family may be employed, and to each green pound of this vegetable matter there are added approximately 4 ounces of water (or equivalent amount of steam) and also approximately 2½ grams of sodium bicarbonate. This mass of vegetable matter, water and bicarbonate is subjected to a temperature of approximately 402° F., while in the retort, for one hour. The temperature may be varied but at approximately 402° F., there results a satisfactory digestion of the vegetable matter and a releasing of the natural gums such that when the entire mass is removed from the retort, it may be molded or shaped into definite form.

On removal of the mass it is molded, preferably under pressure, into slabs, blocks, strips or plate-like form, so that it has the semblance of hard rubber, substitute wood or substance of a plastic nature. To prepare the product for use, these strips, blocks, plates or sheets of material are dried in an air or vacuum oven at a temperature of from approximately 100° F., upwardly, 150° F. being quite effective for the purpose.

Sheathing

In some instances, it may be desirable to eliminate the drying step in the oven and this may be done as, for example, in the preparation of large slabs or sheets of the material for use as wall-board, sheathing, and the like.

Where the product is to be made with dry vegetable matter, the proportions of water and gum releasing agent, or other carbonate or bicarbonate of the alkali or metallic variety, to the amount of vegetable matter are increased approximately 10 times, the method or process being otherwise as already described.

Natural Binders Used

The treatment of vegetable matter under the method of this invention brings about a release of the natural gums and presents such gums and the solids in the form of a plastic mass wherein on pressing or molding of the mass, the gums will serve as an effective binder. One of the characteristics of the product is that it will not appreciably shrink or warp on being dried and for this reason in the molding or pressing of the mass into form, various fancy or decorative figures or structural forms may be pressed, molded, or set up.

(*Continued on page 417*)

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EDITORIAL · IMPRESSIONS

What of the Radio Market?

THE trend in radio receivers has certainly been decidedly away from the dials formerly so prominent. Many molders who had seen in the overwhelming sweep of radio an unlimited future market were due for some heavy disappointments. Of course the advent of the illuminated dial helped a little.

A revolution has also taken place in the panels; or, perhaps, to be more accurate, there has been a revival. After the "craze" for "low-loss" parts and panels, there came the present demand for "shielding," and where one formerly shunned all metal as though it were rank poison in a radio set, now all the tubes, coils, etc., are literally "canned" in metal.

Needless to say this has likewise made many an expensive mold obsolete. However, there is one very hopeful sign, and that is the steady demand for molded radio sockets. The change over from the sockets used for the UX/201-a types of tubes to the UX types, in which the prongs of the tubes pass into slots, and the great increase in multi-tube receivers have made the socket business excellent.

Bases on Audions

Furthermore, all radio tubes now have molded insulating bases, as contrasted with the brass bases used up to 1924. This makes up in consumption of molding powders for a good part of the loss due to the passing of the heavy molded dials.

Some recent patent decisions have served to clear the field, and to limit the exploitation of radio to a number of large and financially responsible companies. This contributes to stability, and the custom molder is no longer faced with the possibility of a lot of his "good" customers passing away overnight and leaving him holding the bag with a lot of molds and parts still unpaid for.

At the recent more or less secret radio show held for dealers only at Chicago, it was quite evident that the producers and sellers of radio receivers are looking forward with great confidence to the best years of their career.

The great increase in the number of devices for utilizing commercial electric current for the operation of radio receivers has also opened up an unexpected field for molded parts. Taking it by and large, it looks decidedly like good times ahead in the molding business.

Standardization

IN the past two issues of PLASTICS as well as in the present issue, we have brought to the attention af our readers the work that is being done abroad on the development of standard specifications for molded electrical insulation.

While we are aware of American efforts in the same direction, we feel, nevertheless, that a comprehensive attempt at standardization in the whole field of plastic materials would be very useful, and should be undertaken.

With new materials appearing on the market almost every day, and with the dearth of information and the secrecy that still surround many of the newer products, it becomes more and more difficult for the designer of parts to determine of what material they should be made.

If a standard list of materials, together with a standard list of the properties of such materials were available, and if the manufacturer could be persuaded to make his materials up to certain agreed standards, it would very materially help the entire industry.

We are making this suggestion in a spirit of helpfulness, and not of criticism, and invite a full discussion of this very important subject in our pages. Nothing would please us more than to contribute toward this much desired goal, and we therefore urgently request that any of our readers who have ideas on this subject communicate with us.

Plastics and the Period Motif

WITH the entry of the period *motif*, the design of toiletware become subject to the turns of Dame Fashion's whimsical wheel. To some extent, this has always been so as regards their color and effect, whether tortoise shell, jade, ivory, or pearl. For even the popularity of the matchless hues of the orchid and rose depends on *la mode* and new varieties must needs be grown in harmony with her decrees.

Now so as not to to feel outmoded, milady will need sets in the prevailing style to replace the passé articles in her traveling case and on her dressing table. Possibly the period idea may extend to the design of sconces and brackets, and the tendency may be to harmonize both mural fittings and toiletware.

Switchplates, too, may be amenable to this treatment, for recent developments seem to be towards the ornate.

This departure augurs happily for the future of plastic materials, particularly the pyroxylin plastics and the casein solids. For it means a recurring demand due not primarily to an extension of their utility, but to their wonderful inherent beauty.

Celluloid Co. Consolidates With Celanese Corp. to Make Cellulose Acetate Plastics

THE Celluloid Company is to consolidate with the Safety Celluloid Company, a subsidiary of the Celanese Corporation, makers of cellulose acetate (Celanese) artificial silk. Protracted negotiations preceded the announcement on July 29, of the complicated terms to be offered to stockholders. To quote from the announcement:

> "The consolidation will unite the patent rights, manufacturing facilities and interests of the Celluloid Company and the Celanese Corporation in the field of non-inflammable celluloid which includes photographic films for moving picture purposes and will open up a larger field in many industries in non-inflammable safety celluloid which cannot be entered with the present inflammable celluloid. The combination of the patents of the two companies makes the consolidation extremely powerful. The Celanese Corporation will control the consolidated company by the ownership of at least a majority in amount of its common."

The New Directorate

Mr. Robert Campbell, president, Chas. F. Reeves, and Harry Soper, vice presidents, and H. E. Cameron, secretary and treasurer, will retain their positions. In addition, two other members of the Celluloid Company's directorate will be on the new board. They are, Walter C. Heath and Winslow S. Pierce.

Other directors will be Lee Cadien, W. McCameron and Camille Dreyfus, officers of the Celanese Corporation; Henry Dreyfus, president of the British Celanese Company, Ltd., John A. Larkin, Joseph Larocque and E. E. Boreham of New York and George H. Whigham of London, representing in this country Robert Fleming, London banker.

Operations to June 30 of this year show a net profit after allowing for depreciation and reserve of $222,542. This compares with a loss of $199,000 for the corresponding period of last year.

Mr. Campbell and Mr. Reeves, who is vice president in charge of sales, are enthusiastic over the new avenues of trade which the non-inflammable product will open to the company. A gradually widening use of the product for purposes now supplied by other products is looked for.

In manufacturing Celanese in the local plant, no changes in plant or machinery or other equipment is expected because of the similarity in processes.

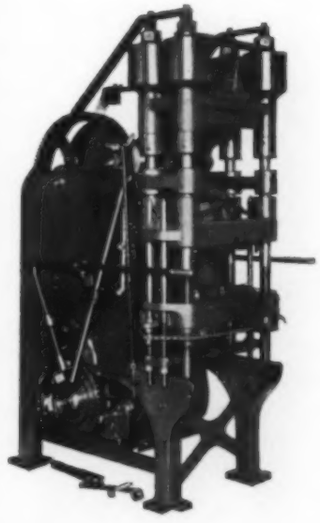
Terkelsen Mechanical Presses

Number Four of a Series

Each press an operating unit

When a manufacturer needs to operate only one press—on overtime, perhaps—that is when he wants a Terkelsen mechanical press. Because a mechanical press is a complete operating unit in itself. Other presses are installed as parts of one complicated system which must be operated even though a single press is in use.

Then, suppose some minor adjustment or repair to this system is necessary. If all the presses are parts of one system, each must stop operating until the trouble is remedied. Terkelsen mechanical presses, being complete operating units in themselves, can continue with production unchecked.



Type A-1 Model 50

Capacity	50 tons
Working Area of Platens	16¾"x12"
Stroke	5"
Maximum Adjustment of Lower Die Block	10"
Motor	1½ H. P.
Approximate Weight	4000 lbs.
Automatic Knockouts	

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In Fine and Coarse Grades

WOOD FLOUR is soft powdered wood, light in color and more or less granular under microscope.

WOOD FIBRE is very fibrous and grades run from a fine material resembling cotton linters and woodpulp to a coarse grade like steel wool.

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NORTH TONAWANDA, N. Y.

General Electric Co. to Enter the Custom Molding Business

THE General Electric Company has entered the custom molding business and will market its product under the trade name of "Textolite Moulded." For many years General Electric has operated, for its internal requirements, two large plants devoted to the molding of a wide variety of molded forms for mechanical and electric purposes, including radiotron bases, knobs, dials and sundry parts; parts of industrial control equipment, wiring devices and all forms of molded insulation.

Duty Cut on Raw Material for Synthetic Resins

CRESYLIC acid, a mixture of cresols obtained during the distillation of coal tar, is an important chemical in the plastics industry. Its constituents, being members of the phenol family, can condense with aldehydes to form synthetic resins. In combination with phosphoric acid it forms tricresyl phosphate. (Lindol), a non-inflammable substitute for camphor in pyroxylin plastics.

While the estimated domestic production in 1925 was about 1,600,000 galls. close on to a million galls. were imported, chiefly from Great Britain. By presidential proclamation, the duty was reduced July 21, from 40% advalorem and 7c a pound to 20% and 3½c .

Celluloid Co. Acquires Higgins' Patents License

THE Celluloid Company, with others, has acquired a license, under the Higgins' patents, for artificial pearl, previously owned by Joseph H. Meyer Brothers, Inc., and now has the right to the manufacture and sale of material made under these patents.

Vulcanized Fiber

(*Continued from page 401*)

say from five minutes to one hour, or as may be deemed desirable for the particular end product to be obtained there is added a suitable precipitant, for example, ammonium sulphate. Since the precipitate thus formed is very bulky, it is widely dispersed and readily clings to the fiber. The beaten mass of fibers is now in suitable condition to be transferred to the sheet forming device or paper making machine where it is formed into sheetlike products of various thicknesses in the usual and well-known manner. The sheets may be dried and rolled for subsequent hydrolyzing treatment or, if sufficiently strong in their wet condition, the operation of forming the sheet and hydrolizing may be a continuous process.

What Durite Is

This laminated composite body may be rolled between heated rolls or pressed as between the platens of a heated press to produce products of various degrees of hardness. When a binding material such as a potentially reactive resin, as, for example, Durite, is used, the resin may be cured under heat or under the combined action of heat and pressure so that it assumes its final infusible form. When this is done the product is of a hard, tough, and moisture-resistant nature. In this form it is well adapted for being molded into various shapes and forms and may be used for the purpose of making bodies of sheetlike form for the mechanical and electrical arts.

The "Durite" referred to is a resin made from phenol and furfural, and is described in U. S. P. 1,398,146, issued Nov. 22, 1921, of Novotny and Kendall.

In an early issue
"Molding With Cellulose Acetate"

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Johnson Products Co., Inc.

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TECHNICAL ABSTRACTS
AND PATENT REVIEW

Reversible comb. Juan de Dios Moreno, U. S. P. 1,624,753, Apr. 12, 1927.

To provide a comb in which the fine section and coarse section can be swung into position without reversing the comb in the hand, the two ends are constructed as shown in the above cut.

Automatic Molding Machine and Method of Feeding the Same. G. A. Gros, assignor to Western Electric Co., U. S. P. 1,607,073; and 1,607,074; Nov. 16, 1926.

Plastic material is heated upon a sliding platen and automatically fed into the dies of a molding machine, the completed material likewise being removed and delivered in a continuous manner.

The second patent concerns itself with the constructional details of the mold and molding machine. A telephone mouthpiece is shown as the object being made.

Apparatus for molding magnetic cores. William S. Buttles, assignor to Western Electric Co., U. S. P. 1,609,460; Dec. 7, 1926.

Hydraulic press for working at high pressures, and specifically intended for the production of molded magnet cores.

Dialyzing and Pervaporating Membranes made from Collodion. P. A. Kober, U. S. P. 1,608, 886; Nov. 30, 1926.

Membranes possessing the properties not only of dialyzing and pervaporation, but also of percrystallization are made by dissolving collodion and gelatine or a peptone in glacial acetic acid, evaporating the solution upon suitably shaped glass supports and then immersing the membranes obtained in water. They are said not to dry out or shrink and to be ready for use immediately. The claims call for nitrocellulose and peptone.

Recovery of camphor, naphthalene and solvents from gaseous mixtures from pyroxylin plastic plants. Jean Henri Brégeat, assignor to Brégeat Corp. of America, U. S. P. 1,613,218; Jan. 4, 1927.

The manufacture of celluloid and similar plastic materials causes evacuation into the air of gaseous mixtures which carry besides such solvent vapors as ether, alcohol, acetone, amyl acetate, etc., substances such as camphor vapor in rather important amounts, and which may run as high as 7% of the camphor put into the process.

Phenolic substances, and especially cresols, usually in form of oily solutions, are used to absorb the solvent and camphor vapors. The camphor etc., is later recovered from the absorbents either by steam distillation, or by treatment with alkalies which while dissolving the phenolic substances will precipitate the camphor, etc.

Preparing pearl essence. Jean Paisseau, U. S. P. 1,615,770; Jan. 25, 1927.

The patent covers an improvement on an earlier application of the inventor, and concerns itself mainly with the materials added to the fish-scale crystalloids or the solutions used for treating them, and specifically to substances which will lower the surface tension of the liquids used to treat the scales. Four formulas are given, covering, respectively: the use of bile; sodium or ammonium sulforicinate; saponine in alcohol; or white of egg and water.

Investigation of artificial resins. Erich Stock, Kunststoffe, 1927,17, 77.

Describes a series of tests on some German synthetic and artificial resins, especially such as are employed for making varnishes and lacquers. Particular mention is made of the **Albertol** resins. Cold-made varnishes were prepared with these resins, and exposure tests made from the solutions obtained. Tests were also run on varnishes made by boiling these resins with an oil. It appears that the varnishes obtained were equally as good as those made from natural resins.

New Synthetic Methods for Making Solvents. Dr. Voss, Kunststoffe, 1927,17, 79.

This article is a review of the commercial preparation of pyroxylin and other organic solvents, giving first the older methods, and then the modern synthetic processes. Present installment deals with methanol (=methyl alcohol). The usual method for preparing this alcohol was by recovering it from the distillates of wood. Synthetic methods are based upon either (1) oxidation of methane, (2), synthesis from carbon monoxide, (3) reduction of formaldehyde, and (4), production from formates. A review of the patented (German) methods for oxidizing methane, and the production of methanol from formates is given.

Apparatus for molding battery boxes. Theron R. Palmer, U. S. P. 1,620,388; March 8, 1927.

Constructional details of an hydraulic press especially suitable for the making of hard-rubber or similar plastic, one-piece battery boxes, molded integrally with the handles.

Cellulose Ester Solvent and Composition. William G. Lindsay, assignor to the Celluloid Co., U. S. P. 1,620,977; March 15, 1927.

BB′ Dichlor ethyl ether, a liquid having a boiling point of 177-178°C at ordinary atmospheric pressure, is employed as a solvent, plasticizer or "high-boiler", in making cellulose ester or cellulose ether lacquers, film-dopes, plastics etc. The new solvent is said to make it possible to combine cellulose esters and cellulose ethers in one composition. Other usual plasticizers or solvents can be used in conjunction with the BB′ dichlor ethyl ether.

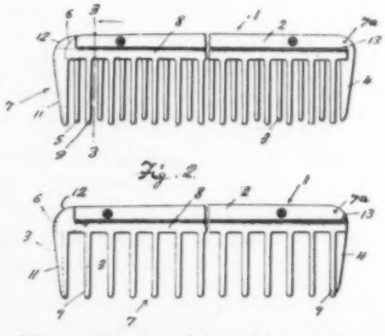
Altering Viscosity of Cellulose-containg materials. Harry P. Bassett, U. S. P. 1,620,938; March 15, 1927

Cellulose derivative solutions of high viscosity can be obtained by a preliminary treatment of the cellulose employed. For this treatment, acid solutions having an hydrogen-ion concentnation equivalent to that of 0.05 to 1% of sulfuric acid are employed, temperatures from 20 to 100°C being suitable, although according to the claims 80°C is preferred. The cellulose thus treated is then washed with dilute alkalies and finally washed free of all reagents.

Laminated Composition Article. William J. Gaven, U. S. P. 1,620,538; March 8, 1927.

A laminated composition is made from the usual hard-rubber or resin compositions by superimposing sheets of paper with a plastic composition between them, either in powdered form or otherwise, and subjecting the assembled materials to heat and pressure.

Adjustable Hair Comb. Henry Sendlbeck, U. S. P. 1,614,631; Jan. 18, 1927.



The comb consists of two parts carrying teeth which may be adjusted toward and from each other to vary the width of the spaces between the teeth in order to provide either a coarse comb or a fine comb

as may be desired. The above illustration shows plainly that by a slight movement of the auxiliary section, the number of teeth is practically doubled.

Fluid-circulating plate for hydraulic presses. Armin G. Kessler, assignor to Farrel Foundry and Machine Co., U. S. P. 1,621,742; March 22, 1927.

The plates are drilled with holes at right angles to each other, and meeting in a line running diagonally across the plate. The ends are tapped for pipe connections. To insure the flow of heating fluid in a circuitous path, additional holes are drilled into the plate so as to intersect the outermost holes, and removable plugs are screwed into these holes so as to divert the fluid and cause it to pass in series through the holes provided. These plugs are removed, and the connections unscrewed, when it is desired to clean the holes in the plate from any accumulations of deposits or to remove obstructions.

Laminated Sound Record for Phonographs. Robert Quait. Jr., U. S. P. 1,621,749; March 22, 1927.

A disc record, bearing printed or lithographed illustrations upon its entire face, including the place where the sound-grooves are located, is made by compressing and impregnating a card-board or similar flat disc of material, printing upon it and then sizing it, preferably with a casein size. Then placing a highly thermoplastic cellulose ester (preferably cellulose nitrate) upon the sizing, in the form of a laquer, and allowing to dry. Finally a very thin sheet of less thermoplastic cellulose ester (again the nitrate being preferred) is placed upon the record, and the sound grooves and undulations therein molded into this uppermost layer in a heated hydraulic press.

Phonograph record for automatic stop mechanism control. Walter C. Hadley, assignor to Columbia Phonograph Co., U. S. P. Re-issue 16,588; April 5, 1927; (of U. S. P. 1,456,434, 1923).

Details of arrangement of the groove at the end of the record for quickly applying the tone-arm of the instrument to the stop-mechanism.

Sound Record. Frederick W. Stone, assignor to Central Commercial Co., U. S. P. 1,623,285; April 15, 1927.

The invention consists in the use of air-floated pulverized slate as the filler for the usual shellac composition used for molding phonograph records.

Furfural and other aldehyde and ketone resins. W. Urbanus, Kunststoffe, 1927,17, 86.

A review of the furfural and ketone resins, evidently based, as have been the earlier articles by the same author, upon the compilation of information contained in Carleton Ellis' "Synthetic Resins and their Plastics".

INCREASED PRODUCTION

and A Reduction in Mold Costs are the Outstanding Features of this

Semi-Automatic Molding Press

WITH

Independent Hydraulic Ejectors

This press has been designed to eliminate some of the recurring mold costs by incorporating certain features into its construction, which ordinarily have to be incorporated in each mold, making it more adaptable to all classes of molds. The operating and mechanical advantages of this press are as follows:

1. Hydraulically actuated ejectors top and bottom. These are operated independently of the main ram and allow the operator to eject molded pieces at any position of the main ram, thereby saving time.

2. Hydraulic reseating of ejector pins and hydraulic operation of ejectors is positive and dependable, which is not the case with spring weighted ejectors.

3. The ejection stroke of the bottom dies is equal to the stroke of the main ram. This long stroke makes it possible to mold deep pieces and eject them without sacrificing any of the press opening.

4. The elimination of top ejector tension rods passing through the top head and bottom platen increases the space available for dies.

5. The bolsters, top head, moving platen and holding down gibs are slotted to allow for varying widths of molds.

The above features tend to increase production and reduce initial mold costs.

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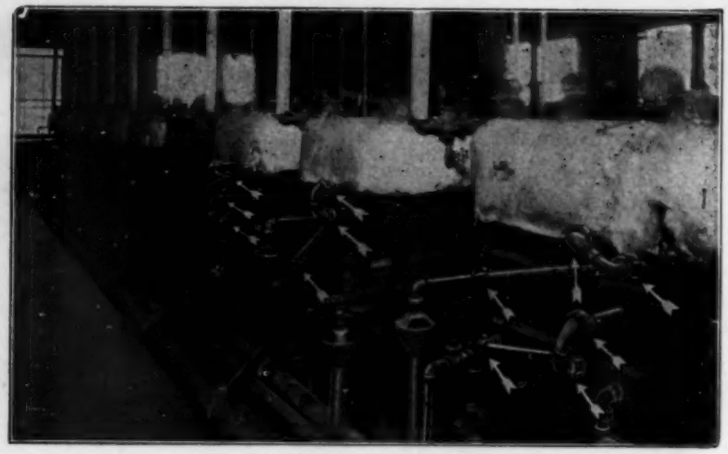

FLEXO Joints

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Style "B" Style "F"

and pipe make the ideal connection between platens on molding presses. Made of steam brass, absolutely rust proof and will last for years. FLEXO JOINTS are as simple as they are efficient. No packing is required; there are no ground parts. High or low pressure seals the joint —tight.

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Combs

(*Continued from page 392*)

The primary object of this particular invention is to provide a comb for barber's use having the teeth so arranged as to permit the hair being picked up on either side of the head in a manner convenient for cutting.

A further object of the invention is to provide an improved comb embodying a plurality of teeth portions having the teeth so arranged in angular relation to one another as to permit of the comb being reversed about its longitudinal axis for disposing the teeth in a reversed angular position upon the movement of the comb in a straight path through the hair.

Especially For Trimming

The figure is a side elevation of an improved barbers' comb constructed in accordance with the invention.

Referring to the figure in detail, the letter A designates generally a frame or body portion including a substantially flat transverse medial portion B having a back section C extending from one end, and having extending in an opposite direction from a point substantially midway of the portion B, a central rib D which preferably tapers slightly toward its free end.

Extending preferably at right angles from one edge of the back section C, are relatively coarse teeth 5 which may be of ordinary construction, and which may be used for combing relatively thick and heavy hair.

Extending at a suitable angle from one edge of the central rib D, and sloping toward the free end 6 of the rib, are relatively fine teeth, which grow slightly shorter toward the free end of the rib as illustrated in the figure.

In use, the comb is moved in a straight upward path through the hair at one side of the head, in which movement, the teeth 7 will pick up the hair and, by virtue of their inclined relation,

will move the hairs in a slight direction toward the front of the head should it be the hair at the right side of the head which is being positioned for cutting.

Styrol Glass

(*Continued from page 394*)

styrol resins by the incorporation with a number of organic dyes. Dr. Ivan Ostromislensky, of the Naugatuck Chemical Co., Naugatuck, Conn., has patented a method of doing this (U. S. P. 1,627,195; issued May 3, 1927; application Jan. 29, 1925).

The patent is a very interesting document to the skilled organic chemist, but the methods disclosed are somewhat too technical for a trade journal. It has been discovered, however, that a number of organic materials, and some which are not very widely used for dyeing, can be applied successfully for the present method of making colored transparent "styrol glass" as the inventor terms polymerized styrol. The polymerization step is carried out at 140 to 175°C.

Developing New Colors

In the strikingly interesting research which quite evidently led up to the discovery, it was found necessary to develop new coloring matters and to improve the known processes in which dyes might be used. A long list of suitable organic substances, such as dichlordiphenylfluorindine, phenylhydrazone of phenylvinylketone, quinone, anthracene and the like is given. It was also found that suitable coloring matters could be made by the explosion of mixtures of steam, styrol and air. The most varied tints can be obtained with the fluorindines in the form of free bases, in which case they impart to metastyrol a rose, red, violet or bluish-violet coloring with a yellow to red fluorescence.

It was also found possible to use various inorganic substances, especially silver and gold salts, and impure silver nitrate gives particularly interesting and startling results.

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Our Chemical Department Specializes in Creating
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Send your Articles to us and our Chemical Dept. will produce the required finish and formulae for you.

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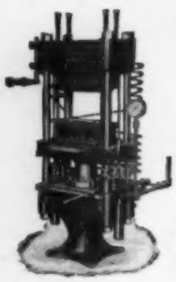
MOLDING PRESSES
UPWARD or DOWNWARD

Fig. 1



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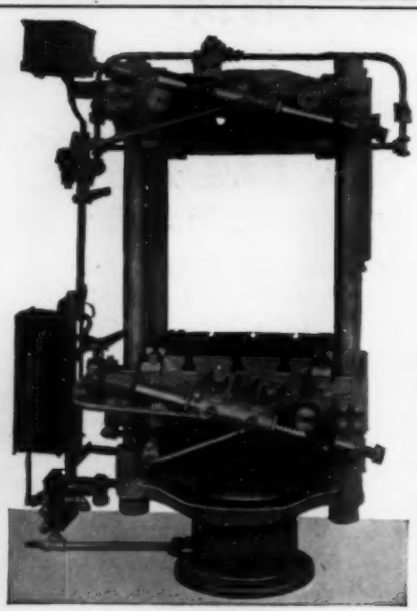

Semi-Automatic
80 Ton Bakelite Press

Moulding Presses

For all Plastic Materials

This cut shows one of ten presses with adjustable ejectors on both top and moving platens.

The high and low pressure operating valves are manipulated by an automatic electric valve control, without cams or shafting.

We manufacture hydraulic presses for all hot and cold moulding processes and also complete equipment including hydraulic accumulators, pumps, valves and piping.

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A new Automatic Control for Hydraulic Machinery.

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PHILADELPHIA, PA.
Established 1803 Works: Florence, N. J.

Such impure silver nitrate as could be made from spent fixing solutions, for example, when added to styrol glass in as minute amounts as 0.001%, and with the polymerization kept up for 15 hours at 140°C yields a pure golden colored product that does not opalesce. When the content of silver nitrate approaches 0.013% the styrol glass takes on a lovely dark red color, but in reflected light it shows opaque and whitish gray of a most curious shade. In thin sheets it displays a peculiar green fluorescence.

To such workers as are interested in this line of endeavor, the above-described patent will be another revelation of what can be accomplished by organic chemical research when intelligently directed.

Casein Solids

(*Continued from page 395*)

practice in the art for the production of the actual shaped articles, as the shaped articles become deformed during the hardening and drying operation, and it is not possible by subsequent treatment to obtain articles that will really keep their shape when in use.

Shaping Before Hardening

"According to the new method shaped articles may be successfully produced from the casein material before it is hardened or after it has been treated only with weak hardening agents, which by subsequent hardening and drying give products which keep their form well. This is effected by using for the manufacture of the shaped articles separate pieces of a relatively dry casein material containing about 20% or slightly less water. The separate pieces of a suitable size and form and a content of water amounting preferably to between 12 and 16% are softened by the action of heat for instance in a current of hot air, no detrimental action on the casein material or by means of any suitable heating device, in steam, a hot liquid which has

given their final form, hardened, dried and if necessary, subsequently operated upon. The casein material which is treated in this way, may be obtained from slightly moistened casein or a casein mixture, for instance by kneading under high pressure, the water content being so small as not to exceed 20%. This relatively dry material may be used directly in the form of pieces out from the extruded length for the manufacture of buttons, counters and the like According to the present invention the pieces cut from the extruded length or formed in some other way may be preliminarily dried, until they are about as dry as the surrounding air, that is contain from 10 to 14% of water. On the other hand the casein material obtained by any process and having any water content may be used for the separate and preliminarily formed pieces after being subjected to a preliminary drying operation until the water content is 20% or less, so that they are approximately as dry as the surrounding air.

From Rings to Bricks

"The new process in which the manufacture of the artificial horn from casein and of the finished articles of all kinds from the same are completely combined, is particularly suitable for the manufacture on a large scale of handles, buttons, toy building bricks, rings, ornaments, bars of different shape and size and the like. It is a special advantage of the new process that the formed pieces are hardened much more rapidly. When working up the moistened casein or casein mixture to form the mass agents having a slight hardening action may be added. The articles formed from this mass need only be immersed for a short time in an effective hardening bath, for instance a solution of formaldehyde, it being only necessary for the superficial layer to be subsequently hardened for ensuring that the articles will retain their shape.

"For giving them a prelim-

Southwark Hydro-pneumatic Moulding and Curing Press

No Pumps or Accumulators

are required to operate
This Southwark Standard
HYDRAULIC PRESS

Operates on Air or Steam Pressure—Requires little space—Simple in operation. Ideal for small shops, laboratories, etc.

The Hydraulic Press illustrated above is designed to operate on Air or Steam Pressure. This eliminates the usual pump and accumulator equipment and makes an efficient and inexpensive installation. Let us tell you about it.

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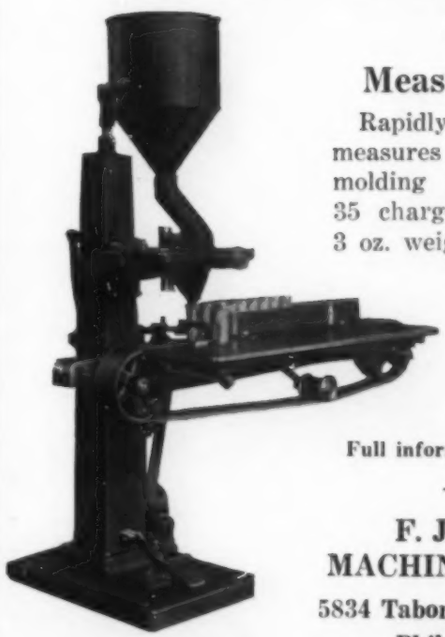

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inary hardening the separate pieces may first be impressed in a bath having a weak action and consisting for instance of solutions of aluminum salts or other metal salts having a hardening action on casein, of tannic acids or other acids having such a hardening action, but preferably in a bath of formaldehyde compounds having a slight hardening action, for instance hexamethylentetramin, until they are hardened right through. The separate pieces even after being dried in this manner may be softened and successfully pressed and stamped. Through this preliminary and subsequent hardening of the surface layer, the time taken for the hardening operation is considerably reduced and still the form obtained by pressing will be such that any subsequent deformation of the pressed articles, such as would take place if the ordinary casein mass were made directly into shaped articles cannot possibly occur."

(Further articles from the able pen of Mr. Prehn are promised for an early issue. Don't miss them, as back issues of PLASTICS, especially the earlier numbers, are out of print.)

X-Ray and Amber

(Continued from page 396)

wall and the fluorescent screen, and the defects are plainly visible as differently shaded areas on the screen. The amber plate is then marked with a pencil introduced through the side of the testing-chamber, and the plate then withdrawn. The work is done in absolute darkness, and the fluorescent screen furnishes enough illumination for the two operators, one of which places the amber plates in a wooden tongs for handling, while the second operator observes the results.

In order to save current, the high-tension line is only thrown on when the amber plate is in observing position, this being accomplished by a foot-pedal. The original article gives min-

ute details of the precautions taken by the management to protect the operators.

It is quite possible that similar methods may be useful in connection with the testing of other plastic materials, especially such as are not transparent and in which interior defects may occur which interfere with their proper use. The cost of operating such an outfit is not very great and the operation can be readily learned by comparatively unskilled girls.

Molded Bearings of Wood and Silicic Acid

SILICIC acid, or the chemical equivalent of sand, for the making of machinery bearings, certainly appears at first sight quite an original idea, but Mr. Nelson R. Haas has accomplished the seemingly impossible result of combining wood flour and silicic acid under pressure.

Contrary to the older methods using wood flour and sodium silicate solution to produce a wet or pasty mass that is molded or cast, Haas employs a dry mixture of silicic acid and wood flour, and molds it under heat and pressure in accordance with the accepted practice for molding the phenol resins.

Among other things he says that:

"In the manufacture of electrical insulating parts, bearings and the like, the molding of dry mixtures can be carried on with greater rapidity, ease and uniformity than the molding of a wet or plastic mixture. Therefore the present invention possesses the advantages of dry molding known to molders of mixtures of wood powder and phenolic condensation products and the additional advantage of relatively low cost due to the use of a cheap binder.

The silicic acid is formed by a combination of commercial hydrochloric acid and sodium silicate. The result of this combination is silicic acid, a jelly-

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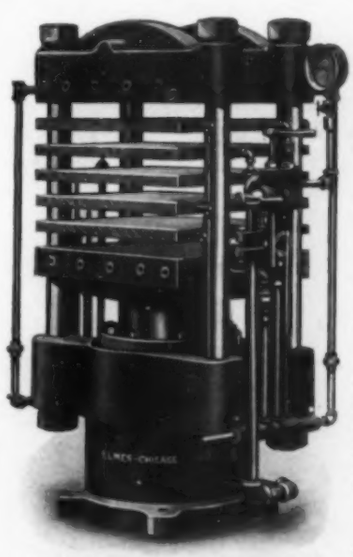

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like substance which absorbs all water of crystallization, and exists in the presence of sodium chloride.

The chemical reaction is

$$4HCl + Na_4SiO_4 = 4NaCl + H_5SiO_5$$

The reaction product is dried, pulverized and mixed with wood pulp powder. For insulating materials not under heavy mechanical stresses a dry mixture of 10% wood pulp powder and 90% silicic acid has been found satisfactory. The temperature employed in the molding press is about 300° F. and the pressure 3000 lbs. per square inch. For the purpose of making bearing materials the proportions are approximately 25% wood pulp powder and 75% silicic acid. The molding temperature is about 300° F. and pressure 3000 lbs. per square inch. It has been found that such a bearing will absorb lubricating oil to the extent of 110% of the weight of the bearing.

The silicic acid as a binder has been found to possess excellent wear resisting qualities, and is practically non-hygroscopic. Therefore products made from these substances have proved very durable, and retain their shape on being exposed to moisture."

As both the raw materials are very cheap, the process should prove economically advantageous. It has been patented on Feb. 22, 1927, and assigned to the Dayton Engineering Laboratories as U. S. P. 1,618,875.

Casein Sheets

RECENTLY the European firm of Internationale Galalith Gesellschaft Hoff & Co., at Hamburg-Elbe Germany, has put cut casein solids sheets on the market, which differ from the pressd sheets in that they are perfectly uniform in thickness all over.

These plates or sheets have no hard surface such as is the case with pressed sheets and there is no necessity for grinding down the sheets to a given dimension. These sheets are cut from a block of hardened casein solids.

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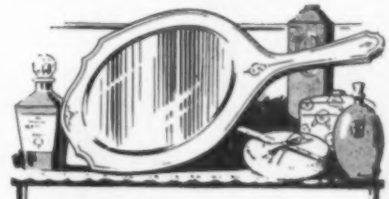

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Cellulose and Rubber Combined

Cellulose and rubber can be combined in the form of a colloidal mass that lends itself to the production of plastic materials of the rubber type; or by using larger amounts of sulfur for vulcanization, for making hard-rubber substitutes.

According to Sidney A. Ogden's U. S. P. 1, 617,495; Feb. 15, 1927, old motor car tires, old rubber hose, rubber boots etc are cut up into small pieces and boiled with 5% of caustic soda and from 2 to 5% of tar or similar hydrocarbon, which partially at least devulcanizes the rubber, and at the same time acts upon the cellulose in the old rubber by a process analogous to mercerization.

Forming Hydrocellulose

The material is next washed and dried but not bone dry, and then treated with sulfuric acid diluted with an equal amount of water or about 45 to 55°Be. at a temperature of 60 to 70° C. for from 10 to 30 minutes. The acid will convert the cellulose into hydrocellulose. The mass is then thoroughly washed free from acid, the final washing being with alkali.

According to the inventor, the cellulose or hydrocellulose is now in a highly colloidal and disperse state and upon milling the rubber on the usual macerating rolls, a perfectly uniform mixture of hydrocellulose and rubber results.

This can be employed for mixing with fresh rubber; as ordinary re-claimed rubber, or for making a number of different plastic compositions.

Only 40 pounds of caustic soda and 40 pounds of tar are needed for treating a ton of old rubber tires.

Plastics From Vegetable Matter

(*Continued from page 402*)

If it is desired to produce an exceptionally hard product of the nature described, there is added a small proportion of metallic carbonates, for example, approximately one gram of carbonate of iron to each green pound of vegetable matter or 10 grams to each dry pound, the method of treatment being otherwise as previously described.

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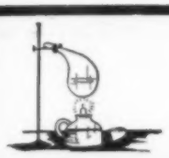

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Seamless Phenol-Resin-Impregnated Tubing

FOR very many electrical purposes, especially for the winding of radio inductances, phenol-resin impregnated laminated tubes are in great demand. Some of the older processes for making these are rather cumbersome, while others, though producing an electrically satisfactory tube, leave a visible line or seam where the two parts of the mold in which the tubes are hardened meet.

In a patent assigned to the Continental Fibre Co., (U. S. P. 1,595,811), Walter C. Anderson describes a method for making seamless laminated phenol-resin-impregnated tubes by employing a molten liquid to apply the pressure to the fabric or paper base while the latter is wrapped around a mandrel.

Made on a Mandrel

One form of the process consists of tightly wrapping on a metallic mandrel heated to approximately 250° F., the paper or fibrous material which has been coated or saturated throughout with a phenol-resin. The fibrous material is heated as it is wrapped to a temperature of 250° to 300° F., which heat combined with the heat of the mandrel causes the several layers to stick together, but without changing the resin to its final infusible and insoluble form. The wrapping is continued until the desired wall thickness is obtained, allowing additional material for subsequent shrinkage. One or several mandrels may be wrapped in this way and placed in a strong cylinder receptacle which is provided with a source of heat such as steam jacket. After the tubes have been put into the receptacle, it is then filled with melted grease.

At least one thousand pounds per square inch is required to compress the tubes properly, and this pressure can only be transmitted satisfactorily to the surface of the tubes by means of a liquid, as liquids are compressible. Another advantage is that the heat is conducted to the tube more rapidly through a liquid than through air.

After the cylinder containing the tubes has been filled with this liquid and pressure of one thousand pounds per square inch is applied to the grease by means of a pump or other means, the cylinder and contents are then heated to about 320° F., the source of heat being the steam which is turned into the steam jacket at about one hundred pounds per square inch pressure. Heat and pressure transmitted by the grease or liquid to the wrappings on the mandrel change these wrappings to a solid tube on account of the chemical reaction in the binder and the application of heat and pressure at the same time.

Takes 15 Minutes

The time required to complete this reaction is at least fifteen minutes after the temperature has reached 300° F. The pressure is then released and the tubes removed while hot, but if there is any water in the cylinder it will flash into steam. It is, therefore, better to hold the pressure and blow the steam out of the jacket. Water is then circulated through the jacket until the temperature of the grease or liquid falls below 212° F. but not low enough to cause the grease to harden.

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A real Steam Table. Steam is generated by a self contained unit and will hold a constant pressure as desired up to 60 lbs. Regular size 16x26".

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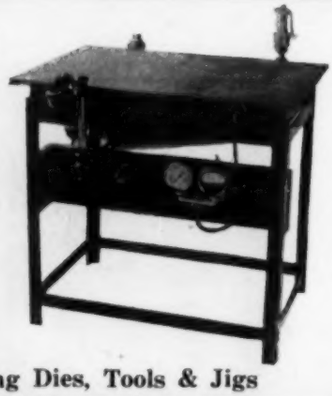

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C. F. Elmes Co. Establishes Export Office

CHARLES F. Elmes Engineering Works of Chicago, have formed a connection with Paul H. Petersen to establish an export office at 420 Lexington Ave., New York City.

Reynolds Spring Co. Holds "Confab"

A COMBINATION of sales conference, banquet and golf tournament was held recently by the molding division of the Reynolds Spring Company, Jackson, Mich. At this "confab" the company's plans for merchandising and advertising for the ensuing year were discussed and announcement made of new products. Representatives of Bakelite Corporation and of various trade publishing houses were guests.

Pyroxylin in Russia

ACCORDING to a report from D. J. Reagan, U. S. assistant commercial attaché in Paris, the Société Industrielle des Matieres Plastiques has obtained a concession for the manufacture of pyroxylin plastics in Russia.

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Vol. 1 AUGUST, 1927 No. 4

Actual Simplified Practice

British Engineering Standards Association's effort as exemplified in its specification for radio panel material is evidence of thorough and patient investigation.

SINCE the first years of the present century, the British Engineering Standards Association has been busy getting order out of chaos in specifications for many widely-used products. These have varied from lamps to lubricants and from controllers for switchboards to crockery for use on shipboard. Not only have savings been effected through simplification, but the investigations instituted by the different groups have frequently resulted in raising the standard of the product studied.

SPECIFICATION 204 of Nov. 1925, deals with ebonite panels for radio reception purposes. As many radio panels are made of phenol resin or one or other of the laminated products, its stipulations should be of interest. The authenticity of its clauses may be gauged from the standing and representative character of the cooperating authorities. Some of these are the Admiralty, Post Office, Wireless (Radio) Board, National Physical Laboratory, Institute of Electrical Engineers and Institute of the Rubber Industries.

The Twelve Clauses

Twelve clauses are described together with standardized methods of carrying out the tests. Some of these, such as sulfur content, acetone extract, ash and density are chiefly concerned with the rubber makeup of the material.

With regard to the breaking strength, the material should withstand 13.5 lbs. with the method of carrying out the test as described. The load is to be applied gradually at one end of a piece 6 mm. square and 80 mm. long, clamped for 20 mm. of its length from the other end.

The absence of electrical surface leakage is an important consideration, and is tested for by applying to the surface of the panel, a contact comb with 25 strips, ¼ inch apart, alternate strips being oppositely charged. To secure good contact at the surface of the panel, the strips are spring-mounted.

Clause 8 stipulates the breakdown voltage the material must withstand. It states that the minimum value of the breakdown volts shall not be less than 1,200 volts per 0.01 inch. (47 kV per mm.) when tested under the conditions specified.

The dielectric loss expressed as a power factor shall not exceed 0.6 per cent when tested at a frequency of 1,000 cycles per second.

Standard Sizes Specified

A list of standard sizes is added and it is recommended that manufacturers keep to these as far as possible. For length and breadth a tolerance of 0.20 inch is allowed, and the following scale of thickness tolerance is permitted:

Not exceeding ⅛"	0.04" + or —
Exceeding ⅛" but not ⅜"	0.06" + or —
Exceeding ⅜"	0.08" + or —

It is recommended that panels should be rectangular, uniform, smoothly finished, with edges squared off.

From time to time other specifications of interest to users of molded parts will be described.

Molded Electrical Insulation

Characteristics and testing of molded electrical insulation are arousing keen interest in Germany

By Dr. Ing. *Sommerfeld*

The classification and testing of molded insulation according to methods evolved by the German society "Elektrotechnischer Verein," were discussed in the June and July issues of PLASTICS, and the present article is a further continuation of the interesting lecture delivered by the author before the said German society.

ONE of the important considerations in the field of molded electrical insulation is the proper construction of the molding equipment. Tolerances in size, which are smaller than 0.2 to 0.3 millimeters are only attained with difficulty. Even though special steels are used for making the molds it often occurs that the wear and tear, even after only 1000 pieces have been molded, is great enough to cause noticeable variation in the diameter of the article.

In order to overcome this, the same precautions should be taken in the design of molds as are practiced in the die-casting industry where hot metals are molded. It is imperative that sharp corners, sudden variations in the thickness of the material or sharp changes in direction of the molded piece should be avoided. As an example of splendidly designed and finely executed pieces of molded insulation the author referred to some of the work turned out by the German concern known as the Siemens-Schuckert Werke.

Development Pays

In concluding the speaker referred to the great benefit conferred upon the industry by the work of the various governmental testing and research laboratories, and the advantages of uniformity in specifications and classification. He also expressed the hope that laboratories would be especially developed which would act as control and central testing stations to further the efforts already made and to conduct development work in the general field of molded insulation, assuring his listeners that any money expended along these lines would earn many times its value in the benefits accruing to the entire industry.

In the lively discussion that followed the conclusion of Dr. Sommerfeld's paper the following points were brought out.

Professor Mathias, chairman of the "Studienanstalt fur Hochspannungsforschung" (Research Institute for High-tention Electrical Phenomena), states that his institute is also taking up the investigation and testing of insulating materials. He stated that it is only recently that the nature of electrical puncture and breakdown of electrical insulation is becoming thoroughly understood, but that much remained to be cleared up. Work is now progressing in various universities and technical high-schools which should do much to throw further light upon this all-important subject.

Prof. Mathias also called attention to the forthcoming "Werkstoff-schau" (Raw Materials Exposition) which is to be held at Berlin in the fall of the present year, at which considerable space is to be devoted to molded and similar electrical insulating material; and where a special demonstrating room for testing materials under very high electrical stresses will be in operation.

(*Continued on page 436*)

"Horse-Proof" Handles

PRINTERS' INK Monthly for November last has an account of an interview with A. F. Hills, entitled the "Sales Force as a Business Unit."

Mr. Hills is Secretary and General Manager of the Crouse-Hinds Co., and certain of his remarks anent molded products are deemed of sufficient interest to warrant reproduction.

IT APPEARS that Mr. Hill's company has an unusual method of compensating its salesmen—the plugger is rewarded as well as the star. To illustrate the difficulty of setting an exact sales quota, the following incident was mentioned:

The company had an excellent salesman in a certain county in Texas who had been calling upon a [illegible] company there over a long period of time. Suddenly the company received word from the customer that unless it could furnish him with a switch handle that horses didn't like, no further business would be received from them.

A request for switch handles which were "horse proof" was so unusual that the company looked into it carefully and this is what they found: The customer owned a factory in which a large number of switches for

(*Continued on page 437*)

Safeguarding the User

Some of the numerous intricate tests carried out in the interest of the purchaser of composition products by the up-to-date laboratory.

By Charles H. Roe

Electrical Testing Laboratories, New York

SINCE many of the uses of molded composition products are found in industry, especially the electrical industry, it becomes important to all concerned that the characteristics of these materials be accurately known. This involves measurements that cannot always be made easily without costly equipment and technical operators of experience.

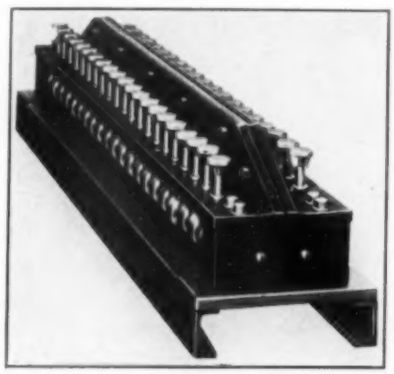


Fig. 1—A special machine for locating points of low dielectric strength in thin sheet insulation.

A laboratory therefore becomes necessary, where accurate and sensitive instruments are available and experienced engineers are ready to perform the work. Such a laboratory may be owned and operated by the manufacturer himself, or it may be a commercial laboratory to which clients may take their problems as they arise. The principal thing to be noted is that apparatus and technique are required. It is comparatively easy to measure the resistance of a few feet of wire in which readings of a few ohms may be obtained, but it is not so simple to measure the resistance of a piece of molded insulation, running up into millions of ohms.

Although to the uninitiated, it may seem better to test the actual finished part itself, measurements of this kind are usually made upon samples of the composition in flat or sheet form. Insulation resistance is measured between the faces of a sheet by floating it in a mercury bath and placing a thin layer of mercury inside a ring resting upon the sheet. The leakage current then flows from face to face of the sheet, through a path the size of the circular layer of mercury on top. A sensitive galvanometer then compares this current with that through standard resistances and the resistivity of the sheet insulation is calculated.

High Tension Resistance

Dielectric strength, or the ability of the material to withstand high voltage, is tested with high voltage transformers. This test, while sometimes spectacular, does not involve the use of much unusual equipment. A special machine devised for testing paper, fiber and other insulation in thin sheets is shown in Figure 1. The sheet is pulled under a series of high voltage electrodes and is punctured wherever a weak spot is found.

In this connection, it should be pointed out that the dielectric strength of a material is not directly proportional to its thickness. Besides thickness, the shape of the electrodes used and the duration of the test are factors affecting the result. So that full details of the method should be known when making comparisons between different materials.

An interesting test is the determination of the thermal conductivity of sheet materials. This gives an indication of the rate of flow of heat through the material. The method was devised by the Bureau of Standards of the United States and gives good results. The sheet to be tested is placed between two plates, one containing an electric unit, and the other made hollow to permit the flow of water through it. A pump circulates water through the hollow plate. Measurements of electrical wattage input and temperatures of the cooling water enable the engineer to calculate the thermal conductivity of the material under test.

Such tests should be particularly useful for compositions to be used for molded handles for percolators, flatirons, gas stove regulation wheels and the like, where cool parts are very desirable.

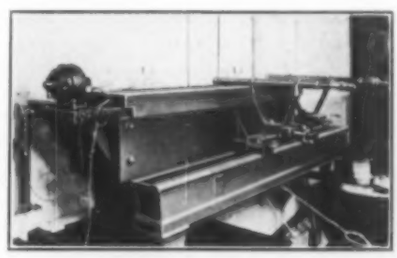


Fig. 2—Measuring the thermal expansion of rods. The sample is suspended in an oil bath. Telescopes enable the operator to determine very small movements of the suspension wires.

Once in a while it is desired to learn the thermal expansion

(*Continued on page 431*)

A modern toilet set carried out in the Sheraton period motif

(Photo courtesy Du Pont Viscoloid Co.)

Period Pattern Toiletware--

a departure of unusual promise

AS a modern development, the use of a period furniture motif in the design of toiletware is essentially new. From the records of antiquity we learn, however, that this idea was already utilized in the far-off days of King Nebuchadnezzer. For as recently depicted in these columns, (PLASTICS, March, 1927 page 108), the ancient boudoirs of Ur in Mesopotamia were graced with such period articles.

Furniture in general and the chair in particular was very rare equipment in those days, but what there was of it was highly carved. In these carvings the bull predominated, so that it is not surprising that milady of Assyria's toiletry should be embellished in what may be styled the Phoenician motif. The overshadowing sphinx similarly found a reflection both in the furniture and the dressing-table ware of the land of the Pharoes.

The art of the Renaissance as exemplified in architecture and furniture left its imprint far and wide. In line with it, even boudoir caskets of carved ivory took on the outlines of palaces and temples.

To the 18th century belong the great masters of furniture design, a period of great activity in this direction. Beginning with Boulle, that master of inlaying, came in rapid succession the furniture patterns know today as the Queen Anne, Louis xv, and Empire periods.

Depicting an ivory paint-pot, sphinx-like, unearthed by Anglo-American savants.

In the latter decades of this century came the Chippendale School, numbering among its craftsmen such artistically famous names as Sheraton, Heppelwhite, Shearer, and Adams. Such is the wealth of artistry at the disposal of the sponsors of the period motif in toiletware design.

The Sheraton Motif

The Sheraton motif has been chosen by the Du Pont Viscoloid Company for its period pattern dressing table articles. Not only do the pieces embody the typical pattern of Sheraton, who by the way, ranks

(*Continued on page 428*)

The KNOB

is Generally an Unimportant Part Until Something Goes Wrong with It

And here's what the AMERICAN MECHANICAL LABORATORIES, INC., manufacturers of the well-known CLAROSTAT variable resistor employed in the vast majority of radio receivers and radio power units, have to say:

"Among other distinctive features —great range of resistance, fine adjustment in several turns of knob, permanent adjustment for any resistance value, noiseless operation, heavy current carrying capacity, reliable and long service—the CLAROSTAT has been distinguished by its attractive, clean-cut, perfectly-fitting and easily adjusted knob of glossy black bakelite with snow-white arrow.

"And from the production standpoint, we have not failed to appreciate the prompt and entirely satisfactory service we have received from the makers of our knobs—the Scranton Button Company. Deliveries have always been on time. Knobs have always been received in perfect condition, with clean-cut moulding, perfect finish, properly-fitting brass insert, and workable set-screw.

"Because of the extra freight and extra handling involved, we are urging our manufacturer customers to purchase their CLAROSTAT without knobs, and to order their knobs direct from the Scranton Button Company as a measure of economy. In this connection we have no hesitancy in recommending them to the Scranton Button Company, and in fact do specify their knob in adding the final touch to our product."

JOHN J. MUCHER, President.

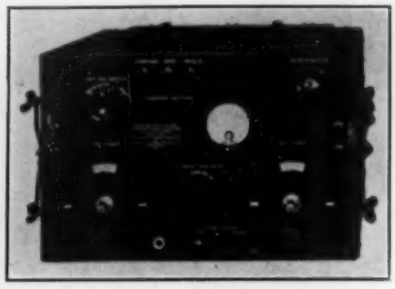
The Scranton Button Co.

SCRANTON, PA.

Western Representative, Gordon D. Wilson
645 Washington Boul., Chicago, Ill.

Arthur Wiseburn, Manager
New York Office, 50 Union Square

Ohio Representative, J. E. Black & Co.
The 4900 Euclid Bldg., Cleveland, Ohio



RADIO continues to be a powerful factor in ensuring the safety of travel through the air, a duty never so arduous as on the recent long-distance flights across the Atlantic and Pacific. Commander Byrd's plane "The America" carried a radio receiver equipped with numerous parts molded of the phenol resinoid Bakelite. No more fitting tribute could be paid the reliability of these materials.

The set illustrated was built by the National Electrical Supply Co., of Washington, D. C.

(Photo courtesy Bakelite Corporation)

Recent Radio Developments

THE entry of radio into the ranks of the mass production industries opened up new provinces for the plastic materials to conquer. This was a natural outcome both of the properties of the composition materials themselves and of the requirements of the new industry. Notably was this so with the phenol resinoids. Not only is their insulating property high, but their uniformity is of great assistance in facilitating quantity production.

For such products as radio dials, true running and a perfect placement and alignment of metal inserts are essentials. Such requirements are well cared for by the faithfulness with which these compositions reproduce the most minute details of the mold and the absence of "cold flow" in the plastic.

While the adhesive property of these resinoids finds application in the production of the various laminated materials, today so widely used for radio panels, it has also a significance for the proper embedding of inserts. Here, both glass and metal are bonded to an extent not found with hard rubber.

Phenol Resin Pre-eminent

The fact that radio-tube bases molded from phenol resin now occupy a pre-eminent position, should be evidence enough of their unique suitability for this purpose. Their distinct ability to resist weathering and the action of the salt sea air mark them out as suitable for ships' radio parts. This is so also where a molded part must be able to resist heat without deterioration, as in radio parts destined for use in the tropics.

Some recent instances of the further use of phenol resin in radio follow. In one, the Bruno variable condenser, the usual small pieces of insulation between the frame and stator plates are replaced by a shaft of the transparent form of Bakelite. There result not only a reduction in body capacity but also an improvement in appearance.

Another appliance is a fixed condenser (Aerovox)) with mica as the dielectric and tin foil plates molded in the phenol resinoid Bakelite. In this way the condenser elements are sealed against the effects of temperature, moisture or chemical action.

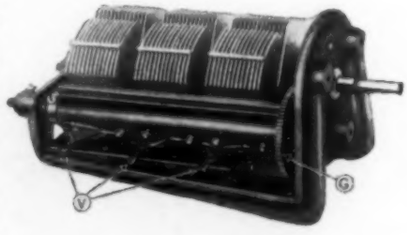
Condenser Gears

The Gray & Danielson Mfg. Co. are putting out a novel three-gang variable condenser. On the front end of each shaft and behind the panel is mounted a pair of Bakelite gears. These are of the same size and mesh with one another. One of them engages with a smaller gear connected directly to the main shaft. When the latter is turned the two sets of plates move equally but in opposite directions. As the gear ratio is fairly high, a fine adjustment is possible to achieve.

One of the logical developments in radio has been the use of house current as electric power supply. For this achievement some type of apparatus for converting (rectifying) alternating into direct current is needed. A recent device for this purpose is the Raytheon rectifier. This can be attached to battery chargers and the cathode terminal is insulated from the outer steel shell (the anode) by means of a phenol resin bushing.

On Eliminators

The usual battery eliminator where not hidden from view is often in the nature of things not conspicuously beautiful. In an attempt to remedy this, laminated phenol resinoid materials are being invoked. Various wood finish styles are being applied while one maker of laminated products is suggesting the use of gold decorated panels.



Bakelite gears (G) are used in the new Remler 3-gang variable condenser. (Illustration courtesy of Radio News.)

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SHAW INSULATOR CO.

IRVINGTON, NEW JERSEY

Established SHAW 1892

A New Molded Dynamo Brush

By binding graphite with silicic acid, a dynamo brush is made, resistant to oil and keeping the commutator clean without undue wear

A molded carbon brush for dynamos which, according to the claims of its patentee, is endowed with many advantageous properties, consists of graphite, silica and salt. The patent is No. 1,633,740 of June 28, 1927 issued to Nelson R. Haas, and assigned to the Delco-Remy Corporation, Dayton, Ohio.

Advantages

The invention includes among its objects providing a brush which is durable, which will not deposit graphite appreciably upon the commutator and which will not unduly wear the commutator during the life of the brush.

It consists in making a brush composed of graphite and an abrasive substance to function also as a binder. For this purpose finely divided silica distributed among the particles of graphite will serve as a binder and abrasive. Hydrated silica or silicic acid is mixed with graphite, and moulded under pressure and heat sufficient to dehydrate the silicic acid and leave silica among the particles of graphite, in such a fine state of subdivision that the graphite particles will be bound together.

Silicic acid can be obtained by treating a solution of sodium silicate with commercial hydrochloric acid. Preferably the sodium silicate solution is about 40% solution corresponding with approximately 37° Baumé. This solution is combined with hydrochloric acid in the proportion of 9 parts of sodium silicate to 1 part of hydrochloric acid. The reaction precipitates silicic acid mixed with sodium chloride,—a jelly like substance.

The mixture of sodium chloride and silicic acid is dried at room temperature. After drying, this mixture is ground and mixed with the graphite in a dry state in a ball mill for approximately one hour. The proportions of this mixture which have been found satisfactory are, by weight, substantially 85% graphite and 15% of the mixture of sodium silicate and silicic acid.

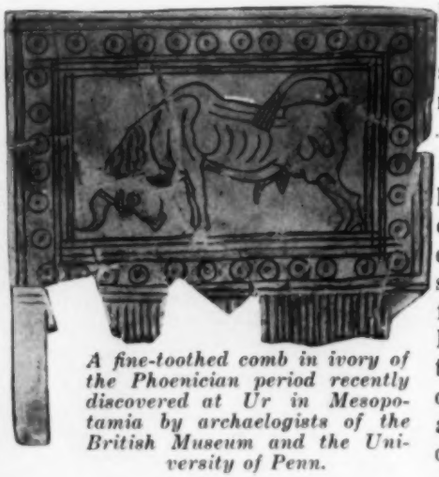
To form a brush, a predetermined quantity of this mixture is placed in a steam heated die and a pressure of about 3,000 lbs. per square inch is applied while the die is heated by steam pipes carrying about 130 lbs. per square inch steam pressure. The corresponding temperature will be about 350° F. The material in the die is subjected to this heat and pressure for about six minutes. The heat dehydrates the silicic acid leaving an insoluble solid including graphite and finely divided silica. Sodium chloride is also present in the brush, and is believed to have a beneficial function as a binder.

A dynamo brush made by the foregoing process has been found to have many desirable characteristics. It will not absorb oil to any substantial

(*Continued on page 439*)

Period Toiletware

(*Continued from page 424*)



A fine-toothed comb in ivory of the Phoenician period recently discovered at Ur in Mesopotamia by archaelogists of the British Museum and the University of Penn.

next to Chippendale as the most famous fashioner of furniture, but his strikingly decorative effects in gold and black are also closely followed.

In keeping with the delicate beauty of the Sheraton design, the pattern is also carried out in various pearl effects laid over black and amber. To harmonize with the style of the sets they hold, boxes have been furnished which serve to carry on the design and atmosphere of the Sheraton period.

Present tendencies in such fittings as brackets and sconces lean towards the highly ornamental and in the near future may culminate in the period motif itself. In the past the design of furniture and mural decorations has at times been reflected in that of toiletware. So that the outcome may be to bring toilet articles into harmony with the others.

To express all the delicate artistry of those old masters of furniture design, there is need of materials of great versatility and color beauty. The pyroxylin plastics and the casein solids are liberally endowed with these requisites and as a result, the industries concerned bid fair to enter a period of growth and prosperity.

You'll Get No Alibis from Us

WHEN we take your order for a molded product we welcome and prefer full responsibility for molds, inserts, molding, and delivery complete. You have just one order and we have one responsibility.

Then it's up to us to make the molds exact the first time, or we're the losers, not you. Your specifications become the specifications of our inspectors, so it's up to us to make inserts and moldings a perfect fit—that's our job, not yours. And delivery has to be made on time to clear our production lines for the next schedule.

Our whole set-up is such that you *must* get action, not alibis—a perfect product, ready for use, right the first time.

We will gladly submit prices on that service, for production in any quantity.

Quality up— Cost Down

HUNDREDS of products, from plugs to pipestems, have been improved in appearance, value and salability, and reduced in cost, by the use of Bakelite, the modern marvel of industry.

Bakelite comes out of the mold smooth and glossy—its attractive surface requires no finishing or buffing.

While light in weight, Bakelite is strong and tough, it resists oil, water and solvents, and is impervious to most acids. Nickel plating solutions do not hurt it. It will withstand temperatures up to 300° F.

Bakelite can be molded alone or with inserts, in simple or complicated parts, to exact specifications. Machining, assembling, hand work are done away with.

Hundreds of manufacturers are turning to Bakelite to solve production and sales problems, and perhaps you could profitably do the same. We will be glad to advise with you, from our experience as old as Bakelite itself. There's no obligation, of course.

Steering column headlight control knob, molded with lettering and imbedded brass insert, in one operation. Made for one of the country's leading motor car manufacturers.

Collapsible radio loop base and wire bracket made from Bakelite to reduce cost. Molded complete in one operation.

A famous oven regulator wheel in beautiful Chinese lacquer red Bakelite. More attractive and serviceable than as formerly made of metal.

PRECISION MOLDERS OF BAKELITE AND SHELLAC COMPOSITION

INTERNATIONAL INSULATING CORPORATION

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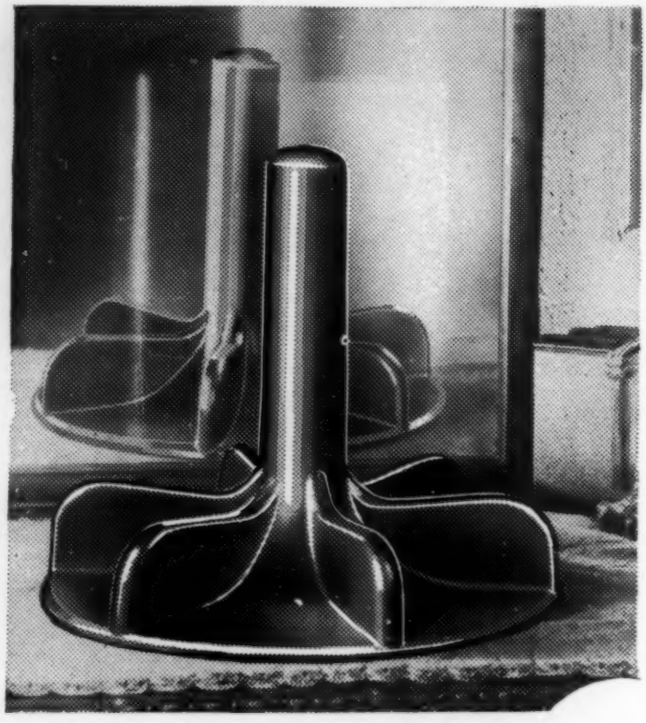

CHICAGO BAKELITE
accomplished the impossible for The Meadows Mfg. Co.

Here was a real job. The impeller in a washing machine. Metal would not do the work. It had to be something that held its polish through wear. Think of the machining necessary on a metal part of this shape-the cost-and the weight.

Chicago Bakelite stood all the Meadows tests and is now used exclusively.

If you use complicated, expensive-to-make metal parts we may be able to cut that expense in two. Anyway it costs nothing to consult us. We are the largest custom Bakelite moulders in Chicago and maintain an engineering department which is at your service to help solve production problems. Our factory is fully equipped with precision machinery and steam operated hydraulic presses.

In tool and die work of the finest finish and detail, heat-treatment and careful attention to the niceties of required accuracy our long experience is your safe-guard.

Send a sample, print or specifications. An estimate will be mailed you at once.

The quality of our work is best attested by the standing of those we serve.

Western Electric Co.
Stewart Die Casting Co.
Electric Household Utilit. Corp.
American Can Company
Johnson Service Co.
Simmons Bed Company
Meadows Manufacturing Co.
Zenith Radio Corp.
Mantle Lamp Co. of America
Conlon Washing Machine Corp.
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Addressograph Company

WE USE ONLY GENUINE BAKELITE POWDERS

Chicago Moulded Products Corp.

SUBSIDIARY TO
PLYMOUTH MANUFACTURING CO.
2150 W. WALNUT ST. CHICAGO, ILL.

Is the White Insulator on the Wane?

DISFIGURING TELEGRAPH POLES.

As more and more of our country roads and lanes are becoming disfigured by telephone posts, may I suggest that the caps of the posts and the insulators should be black instead of white? We should at least be spared the rows of ugly white spots as seen against trees and sky and landscape.—LADY GODLEE. Coombe End Farm, Whitchurch, Oxon.

Lady Godlee's accusation as it appeared in the London "Times"

JUDGING from this extract from that irreproachable medium "The Times" of London, there is much solicitude nowadays for the beauty of the English countryside. It seems that a few white insulators perched on a pole can mar the peaceful loveliness of the age-old lanes of England. The black telegraph pole with its cross-trees merging more or less successfully with the adjacent tree trunks are forgiven, but those white insulators spoil the effect and are seized upon as the culprits in the case.

Catering to this tenderness towards conserving the beauty of the rural scene, an all-black insulator ("Ebonestos") is now being marketed. The manufacturers claim that their products, while equivalent to white insulators in service, will retain the goodwill of country folks. Possibly somewhat similar considerations can explain the prevailing popularity of green insulators in this country.

In winter, of course, such insulators would still be in harmony with the leafless trees, or, perhaps, if the weather pundits are to be believed, that English fog one hears about so often, would contrive to mask landscape, telegraph poles, insulators and all. Why, as a British Post Office Department, the telegraph service did not long ago specify Post Office red for its insulators, would seem to be worthy of explanation.

Molded Novelties Increasing

EVEN a cursory trip through the gift shops and department stores will serve to emphasize the constant increase in the number of molded novelties and the trend towards replacement of metals by composition materials.

One of the largest stores in the United States located in the Middle West has some decidedly attractive molded objects on display in the section devoted to sports and smokers' articles.

Some of the articles on display are cigarette boxes in the form of large containers with a rotatable inner compartment; ash trays that nest one into the other; humidors for cigars made entirely of phenol resins in excellent imitation of mahogany and similar woods; and a large number of small statuettes in a sort of translucent material Although the latter has the general appearance of marble, it only too evidently shows the earmarks of the molding process.

Most of the articles show very fine workmanship, and it is to be hoped that they are all of American manufacture.

Testing

(*Continued on page 423*)

coefficient of a material—that is, how much it expands when heated. For this purpose, the material is usually tested in the form of rods, tubes, or strips. The samples are immersed in an oil bath and the temperature of oil is then varied by electrical means. Suspension wires holding the samples in the bath then move apart as the samples expand and this movement is read very accurately through a pair of telescopes. These measurements, with the temperature

(*Continued on page 439*)

ESTABLISHED 1915
Members in
American Institute Electrical Engineers
Society Automotive Engineers Radio Manufacturers Association

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from Plastics such as BAKELITE and EQUIVALENT COMPOUNDS

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Gentlemen:

You may send me a sample souvenir of your plastic molding work. We are interested in learning what you can do for us to help lower our costs or improve our products by utilizing your plastic moulding facilities and personnel.

Name of Company .....

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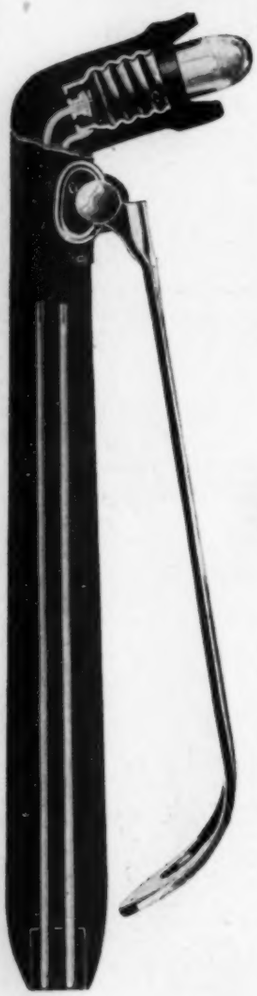
SOUVENIR—ARTISTIC LETTER OPENER

Cameron Surgical Specialty Co.



Part Molded of Bakelite by Schneider

The intricacies of this moulded part, its lustrous finish, and the exact perfection of its details are fair ideas of what to expect when ordering your moulded parts

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SCHNEIDER ELEC. & MFG. CO.
312 N. Sheldon St.
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Trade Moulding Exclusively

Up-to-date Fittings

WHILE it must be conceded that lacquered brass for lamp holders has the merit of pleasing appearance, yet composition holders can both look good and give excellent service. Indeed, in certain places, the latter are very much to be preferred.

With sockets molded of phenol resins there is no possibility of corrosion, so that the molded threads cannot bind. Moreover, the lasting surface polish developed during the molding process itself makes lacquering, as with brass, unnecessary. When the protective lacquer wears off the brass corrosion may set in with a resulting possibility of leakage and shocks. Such molded sockets are especially suitable for the bathroom and kitchen or wherever water is likely to condense.

In Factories

In the industrial field, there are numerous places where these non-corrosive and shock-proof sockets can replace the corresponding metal parts with success. To mention only a few, the air in laundries, breweries,

In the centre, the Graybar hanging unit; on either side its seven Bakelite constituents including the globe holder. (lower right).

Electrical Are Molded

cotton mills, dye-houses and fruit warehouses is liberally charged with water vapor. Water is thus liable to condense in the electrical fittings. Indeed, the danger from shock has been recognized by certain English factory regulations which specify that all such parts be earthed.

The liability to corrosion is even greater in such places as plating, rubber, and chemical works in general. Corrosion is very pronounced where there is much steam and smoke as in locomotive barns and foundries.

Salt-laden Localities

Salt laden air is very conducive to rapid corrosion. So that the molded socket would be the proper electrical equipment for coast towns, ships, harbor works and similar buildings situated by the sea.

The Graybar Unit

In lighting the new Graybar building, in the Grand Central Terminal, New York, a hanging unit was used comprising seven Bakelite molded parts. In fact, with the exception of the inner suspension chain, the wires and the lamp socket, there is nothing of metal below the outlet box.

Even the globe holder is molded, a part liable to much strain under vibration. An outstanding feature of this unit is its adjustable length. Usually the stem comes in three sections, but more or less of these can be provided as called for. Further all parts are interchangeable.

To facilitate shipping and installation, all the parts are threaded on a beaded chain, and can fold over to fit into a small carton.

KELLOGG

TELEPHONE RECEIVER

Can Help You Solve Your

INTRICATE MOLDING PROBLEMS

If you have an especially delicate or intricate job of molding to be done, let Kellogg help you.

FOR YEARS

Kellogg designers and molders have solved many of the molding problems that have come up in the telephone and automotive industries. This experience has caused the users of Kellogg molded products to expect finer finish and greater accuracy than is ordinarily required.

RADIO TUBE SOCKET

Large batteries of presses enable Kellogg to give you prompt delivery.

Years of economical production methods assure you of right prices.

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WRITE--

stating your problems; we'll gladly help you; and you won't obligate yourself in any way.

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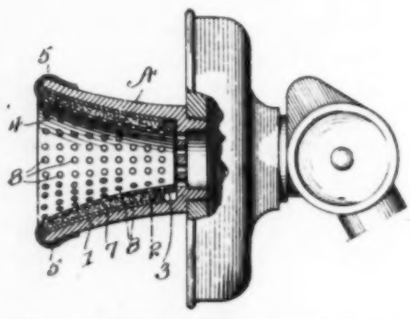
AUGUST
MUSIC turns to the moulded part. For years the Auburn Button Co. has molded Celluloid and Bakelite parts for musical instruments. Here, perhaps more obviously than any other example, the precision and beauty of Auburn works is apparent.
Pioneers in Plastics
Founded in 1876

Auburn Button Works

Auburn, N. Y.

An Aseptic Mouthpiece

IT must be recognized that some danger of infection lurks in the widespread telephone especially in the public pay station. Measures taken during recent outbreaks of "grippe" have but served to emphasis it.



The mouthpiece cut away to show the method of fitting the disinfecting attachment.

To counter this danger, the mouthpiece must be capable of sterilization and to facilitate this process, glass mouthpieces have been installed here and there. These, however, are fragile. Mouthpieces molded of phenol resin are very suitable, being sanitary, non-absorbent and unaffected by the disinfecting solutions. Starite, a product recently described (PLASTICS, June, 299) is claimed to be aseptic of itself, a property of much interest in the connection.

Details

To dispense with the troublesome sterilizing, the telephone, speaking tube, or musical instrument mouthpiece itself may be provided with this disinfecting attachment, and the invention under review is one such device.

In explanation of the diagram, the ordinary mouthpiece (A) with a shell (1) is provided at its lower end with an inner right-angled flange (3). An inner shell (4) fits into the outer shell (A) forming a friction fit with the inner annular

flange (3) and is held in position The latter engage the outer shell by means of the ear-pieces (5). at diametrically opposite points. A rim overlying the edge of the mouthpiece serves to retain the disinfectant (7) between the shells. The fumes from the disinfectant can percolate through the rows of holes provided in the inner shell.

As the attachment makes a friction fit, it can be attached and removed with ease, for recharging for example.

Charles H. Monks is the owner of the patent covering the device: U. S. Patent 1,633,441 of June 21, 1927.

In the New G. E. Refrigerator

REMARKABLE alike for its popularity as for its efficiency, the mechanical refrigerator for domestic purposes has literally taken the market by storm.

In its latest small model, the General Electric Company, has introduced the use of a laminated phenol resinod. In the form of strips, the latter lines the beveled edges of the door. In this way, a closure is obtained, air-tight and insulating. Not only is the material durable, sanitary, and non-absorbent, but it is also washable. As there is no enamel on its surface, there can be no likelihood of chipping.

The same self-contained model has its supporting members fitted with molded sliders similar to "Domes of Silence." These have the advantage over metal of retaining their polish under wear and are more lasting than wood. Unlike glass, they are not liable to crack.

Omission

IN the story "Music Turns to Composition" in July, mention was omitted that the pyroxylin plastic musical fittings illustrated were supplied by the Celluloid Company.

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—in a spacious, modern, daylight factory equipped with the finest machinery.

WHERE SKILL IS PARAMOUNT

—a staff of experts make possible a constant dependable supply and prompt deliveries.

Pioneer Molders of

BAKELITE

Hundreds of manufacturers have come to us with their molding needs—finding here expert engineers ready to advise and assist them without charge.
Perhaps our engineering department can show you, too, how you can reduce your production costs and even increase the efficiency of your product by the use of molded Bakelite.

Your request will have our immediate attention.

Our 20 years of service has been a guarantee of our reliability.

Northern Industrial Chemical Co.
Established 1908

11 Elkins Street **BOSTON, MASS.**

Beautiful Jars and Containers Moulded in Varied Pastel Shades and Mottled Effects

This is one of the many beautiful numbers moulded by Mack featured in line of Woodworth Inc., N. Y.

MACK MOLDING CO., Inc.
Little Falls, N. J.

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MOULDING

Is The Mould

WE MAKE Our Moulds

The moulded part can only be as good as the mould in which the material is moulded. We've been building moulds for the plastic moulding trade for many years and know how to make them right. When you place an order for moulded parts, we are in a position to furnish the goods.

Send us your samples or drawings for quotations.

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Molded Insulation

(*Continued from page 422*)

Privy Counselor Weber remarks that the general interest in molded electrical insulation is growing with leaps and bounds, and that the demand is constantly increasing. Of special interest is the recognition of the value of molded products as a substitute for metallic parts, not only from the viewpoint of decreased weight and corrosion difficulties, but from the life-saving point of view, as many articles can now be made from insulating materials and contact with conducting substances carrying current thereby avoided.

Needed Improvements

He proposes that when the point has been reached where a sufficiently strong molded switch-box can be offered to the trade, that many industrial accidents in the electrical field will be avoided. The main desiderations are an increase in the structural strength of the insulating materials, and greater resistance to heat and moisture, so that metals may be completely replaced for all parts except such as are purposely intended to conduct electric current.

Incentives to Research

Herr Weber also reminded the audience that as long ago as the late nineties of the past century a number of tests on molded insulating materials had been carried out at a testing station in Munich, Germany, and that at the time samples of such material had been brought over from England. Also that about 25 years ago there was mention of a proposed prize offer on the part of the German Electrotechnical Society for a systematic research on insulation, but at that time there was not enough public interest to prompt any one to take up the problem, with its inherent great difficulties.

In answer to a query in regard to oil-proof qualities of molded insulation, it was stated that the

articles molded from the artificial resins, provided they had been hardened into their final infusible stage, had proven satisfactorily resistant to solvents such as alcohol, benzol, tetralin and the like. It should not be forgotten that the artificial resins also had a soluble stage, and that this probably led to some confusion in the minds of the users. Heat and pressure converts these resins into the desirable infusible and insoluble condition. Molded articles made in separate parts and then put together by an adhesive consisting of solutions of the artificial resins can be rendered oil and solvent proof by a short heat treatment to indurate the resin used in cementing them together.

Further remarks in the discussion of this paper by Dr. Sommerfeld will appear in our September issue of Molded Products.)

"Horse-proof" Handles

(*Continued from page 422*)

electrical appliances were placed on the outside of the factory wall. With this outside exposure, a fine opportunity was offered to the horses who were often tethered outside of the customer's plant. You know how a horse is. He seems to be particularly interested in munching hard substances, and something in the composition of the Crouse-Hinds switch handles appealed to these Texas horses.

Diet of Handles

Unfortunately for Crouse-Hinds, similar switch handles made by their competitors were not in demand as diet by these mustangs, so that in actual use the competitors had a knock-down sales argument so far as switch handles for that particular factory were concerned. So simple an expedient as building a fence or enclosing the switch handles wasn't possible, due to actual use conditions.

The production department, in consultation with the sales-

Walnut Bakelite Handle with Threaded Nickel Insert—Brass Collar Molded in Bakelite Ring to insulate and form a press fit—Bushings are also a press fit in a drilled hole.

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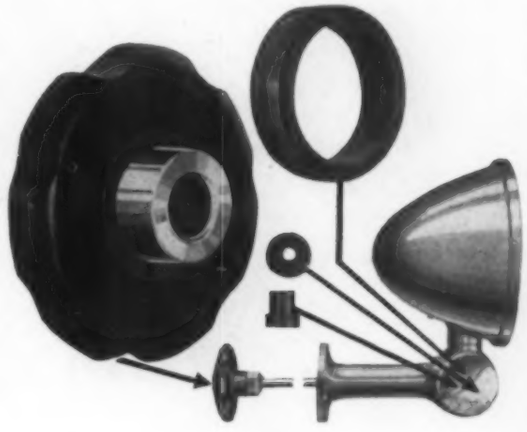

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man on the job, figured out a new composition for switch handles which horses wouldn't be so interested in eating. The customer was satisfied and the salesman was able to go back with a product which met his customer's actual needs.

Experience Not Unique

Several other similar examples which I have picked up recently in interviewing sales managers, and which they uniformly ask me not to use as being inconsequential, still remain, in my personal opinion, important. The sales manager may hear them only occasionally. Multiply these peculiarities in local buying habits by the number of times they actually happen and we have a situation which demands flexibility in quota fixing, the closest sort of personal contact between the sales manager, his men, and the production department. For every one of these peculiar incidents which come to light, ten, I believe, are suppressed by salesmen who are afraid of being accused of being highly imaginative in their alibis.

Meeting unusual local conditions is a problem which is too often left to the salesman alone. His firm's whole sales policy, in a majority of cases, is built around the thought that territories are approximately the same in prejudices, peculiarities and unusual situations. Any salesman, speaking confidentially to his friend, will deny such a supposition. Most sales managers are more interested in quotas than in local peculiarities.

They are often thinking primarily in terms of individual stars who are out after big records. In the meanwhile, a great volume of business is likely to drop through holes left uncovered in the rush for big orders. The great volume of business turned in week after week by the steady pluggers may easily be neglected in the enthusiastic battle for big business among the scintillating stars of the sales force.

Testing

(*Concluded from page 431*)

readings, provide data for calculating the rate of expansion. Fig. 2 illustrates the apparatus necessary.

It was to fill the need for testing methods with a scientifically accurate basis that "Committee D-9" of the American Society for Testing Materials, came into being. It consists of engineers from some of the chief electrical companies and manufacturers of insulating materials.

Molded Dynamo Brush

(*Continued from page 428*)

amount. It will not smudge the commutator, that is, deposit particles of free graphite which, if mixed with oil on the commutator, would interfere with the passage of electric current. It will place a reasonable amount of polish on the commutator and will not wear it appreciably.

Although the proportions of 85% graphite and 15% of the mixture of sodium chloride and silicic acid have been found desirable, it will be understood that within reasonable limits other proportions will be found satisfactory. It is obvious that the quantity of the mixture of sodium chloride and silicic acid must be sufficient to provide the binder for the particles of graphite, and to supply a sufficient quantity of abrasive material, desirable in brushes, in order to avoid brush squeak, when using a brush containing no abrasive.

Silicic acid has also been used as a binder to make molded self-lubricating bearings. (See *Molded Products*, June, 1927, page 292, and 415 of the present issue.

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